



FRIDAY, JULY 5, 1878.

MASTER CAR-BUILDERS' ASSOCIATION.

Twelfth Annual Convention.

THIRD DAY.

On calling the convention to order the PRESIDENT stated that the discussion on uniformity in cars was first in order.

On motion of Mr. C. E. GAREY the discussion was closed.

The PRESIDENT stated that the Committee on Substitution of Steel for Iron and Iron for Wood was unable to report, owing to the sickness of the Chairman.

On motion of Mr. ADAMS the committee was continued, Mr. John Kirby being substituted for Mr. J. B. Hill.

The Committee on Improvements in Cars being called on,

Mr. ADAMS stated that Mr. Chamberlain was unable to be present, owing to the press of work resulting from his recent change in position.

On motion, the committee was continued, Mr. U. H. Kohler being substituted for Mr. W. W. Wilcox.

Mr. ADAMS, from the Committee on Decrease of Dead Weight in Passenger Cars, stated that no new facts had been brought out and no report made, because it would have been simply a repetition of that made last year. He thought better progress had been made in this direction with passenger than with freight cars.

Mr. WIERS thought it better to have heavier cars and carry larger loads.

Mr. S. A. DAVIS also thought it better to have the cars a little heavier and carry 15 instead of 10 tons. The great point was to have the wheels and axles heavy enough.

The PRESIDENT said that his four-wheel coal cars carried eight tons, and the eight-wheel cars 15 tons and worked very well. Their standard box cars were made to carry 12 tons, and they had some 34-ft. cars which carried 15 tons. They ran 45 loaded or 60 empty cars in a train without trouble.

Mr. ADAMS spoke of the Ohio Falls Car Works' four-wheel coal car carrying 12 tons, having a wheel-base 11 ft. long.

Mr. WIERS had seen those cars and understood they were doing very well. The Louisville & Nashville cars of similar pattern were also working well. They were not, apparently, hard on the track, but time would show.

Mr. PRATT said that on his road (the Cleveland, Tuscarawas Valley & Wheeling) they were using two of these four-wheel cars, one of the Ohio Falls and one of the Louisville & Nashville pattern, and liked them very well. Their eight-wheel coal cars had the standard axle and carried 15 tons.

Mr. ADAMS said that on the Boston & Albany the sides of their coal cars were 24 in. high and they carried 13½ tons. He had made one with 30-in. sides to carry 15 tons. The coal, however, varied very much in weight, but he thought some of the statements too large.

Mr. KIRBY said the coal was heaped up in the middle.

Mr. ADAMS said that on their short curves they would shake the coal off if they piled it up.

Mr. PRATT said they put all the coal on their cars that they could get on.

The PRESIDENT said that their four-wheel cars on the New York Central weighed 9,300 to 9,500 lbs. and carried eight tons. They had 500 of them, and preferred them to the eight-wheel cars.

On motion, the Committee on Dead Weight was discharged.

The Committee on Standard Axle being called:

Mr. FORNEY said that Mr. Chamberlain had been called to a new position, and had been kept busy there until too late to prepare a report. He then stated the action of the Master Mechanics' Association in appointing a committee to confer with the Master Car-Builders, and thought that the committee should be continued, with instructions to confer with the Master Mechanics' committee. He also offered a resolution requesting the Eastern and Western Railroad Associations to confer with the committee.

After some discussion on the form of the resolution it was finally made to read as follows:

"Resolved, That the Eastern and Western Railroad Associations be requested through our Secretary to appoint one or more competent experts to confer with the Committee on Axles appointed by this Association to consider the subject of the adoption of the form and proportions of the Master Car-Builders' standard axle as the standard for tenders and cars for this country and Canada."

Mr. ADAMS wanted some expression to the effect that the Association was not willing to give up its standard.

Mr. FORNEY was not at all disposed to back down from the standard, which he had always advocated. But he found that the Master Mechanics were disposed to adopt it, and he thought that if the approval of the Eastern and Western Associations was secured it would put the matter beyond all dispute.

Mr. ADAMS seconded the resolution, but said that he had always been opposed to the appointment of a new committee on this subject.

The PRESIDENT said that he knew of several cases where their standard axles were used under tenders.

Mr. MCWOOD said that on the Grand Trunk they had the standard axle under all their passenger cars, 400 freight cars and part of their tenders.

Mr. C. E. GAREY thought the adoption of the standard axle was a great step toward uniformity.

Mr. ADAMS said that he had at first criticised the form of the resolution, but he recognized the fact that Mr. Forney had always advocated the standard axle.

Mr. VARNEY had 400 cars with the standard axle, and was satisfied with it, though he had voted for a smaller journal.

After some debate as to the number of the committee, it was resolved to continue the committee with instructions to confer with the Masters Mechanics' Committee, and Mr. Adams was substituted for Mr. Chamberlain as a member.

Mr. FORNEY's resolution was then adopted.

The PRESIDENT then read the following question, submitted by Mr. WATROUS: What would be the most suitable size of axle and journal for a 42-inch wheel?

Mr. ADAMS thought the standard axle should be used and that the only question would be as to size of wheel-seat.

Mr. MCWOOD said that he used a standard axle, increasing the diameter of wheel-seat to 5 inches.

Mr. KIRBY thought 5 in. was quite large enough. If they were made larger it would be impossible to use the axle for freight after they were taken out from passenger cars without turning down the wheel seat, and that would injure the axle.

Mr. ADAMS asked how it would injure the axle.

Mr. KIRBY said it would make it nearly straight. He knew that some preferred a straight axle. He thought 5 in. diameter was quite enough.

Mr. HOLMES thought that if the 42-in. wheel took less power to move it than the 33-in., it would not require a larger wheel-seat.

Mr. ADAMS said that with the 42-in. wheel there was a greater leverage and a greater lateral strain.

Mr. MARDEN intended to put in some 42-in. wheels, and thought this question as to the wheel-seat should be settled by practical tests.

Mr. S. A. DAVIS thought the standard axle better able to hold a 42-in. wheel than the old 4-in. wheel-seats were to hold a 33-in. wheel.

The PRESIDENT said that he would have no hesitation about putting 42-in. wheels on the standard axle; in fact he had done so. He saw no reason for increasing the diameter of the wheel-seat from 4½ to 5 in.

The discussion was then closed.

A short discussion then took place on the question of dropping the names of members in arrears from the roll. No action was taken.

The PRESIDENT then read the following question, submitted by Mr. J. W. HOLMES: Does the present method of loading freight in cars have any material effect in causing flange-wear, derailment and hot boxes?

Mr. ORTON said that freight was often loaded very unevenly.

Mr. HOLMES had his attention drawn to this matter by discussions in the Association, and had taken particular pains to investigate it. He was convinced that improper loading of freight was one great cause of these troubles. Cars were frequently loaded so that the weight was very unevenly distributed on the journals. The overloaded journals were very liable to heat, and the tendency would be to force one truck against the rail, causing undue wear and sometimes even making a wheel jump the track. He had frequently examined loaded cars, and was convinced that much trouble was caused from this bad distribution of the load. He had also been persuaded that this was the cause of many unexplained derailments.

Mr. ORTON thought this matter was beyond their control, though an expression of opinion might do good. In some cases an even distribution of the load was not possible, from its nature.

The following question was submitted by Mr. FORD: What is the best way to secure board roofs on freight cars?

The PRESIDENT said that this was a very important matter. Their General Freight Agent had called his attention to the heavy bills for damages caused by leaky roofs, and to inform himself he had had an examination made of the roofs of all cars passing over the road from May 16 to May 31, 1877, with results that may be expressed in a table as follows:

Road.	Whole No. cars.	Per cent. of bad roofs.
Boston & Albany	1,134	84
Chic. Rock Island & Pacific	210	28
New York Central	7,308	1,148
Troy & Boston	126	28
Michigan Central	882	238
Boston & Maine	126	42
Chicago & Northwestern	126	42
Grand Trunk	290	84
Lake Shore & Michigan Southern	2,072	742
Great Western	7,888	518
Chicago Southern	829	418
Toledo, Peoria & Warsaw	518	326
Ind. Bloomington & Western	416	322
Wash.	448	252
Cleve., Col., Chi. & Ind.	644	396
Rome, Watertown & Ogdensburg	294	98
Utica & Black River	112	112
W. & H. C. (9)	98	28
Terre Haute & Indianapolis	56	42
Other roads	4,678	1,400
Total	21,172	5,228
		23.53

This showed how much attention the matter needed.

Mr. ADAMS said that they had tried several ways of putting on roof-boards, and had settled on steel nails as the best. Most of his leaky roofs had been on oil-rack cars.

In answer to questions the PRESIDENT said that instructions were given to examine the roofs both inside and out. They had found leaks both small and large. No record had been kept of the kind of roof. He was using a tin roof, but thought well of the double-board roof. He had had much trouble from nails breaking, both on the roofs and siding.

Mr. ADAMS said that they used tin roofs of good quality and carefully put on. For that section, where lumber was dear, tin was the most economical roof. He used steel nails altogether as much better than any others. He believed the time was coming when a steel roof could be made.

Mr. WIERS said that they had given up the double-board roof and were using galvanized iron.

The PRESIDENT said that the life of the average double-board roof was two years, but they were very apt to leak soon unless carefully put on. They had given up tin, because it so often had holes knocked in it by trainmen walking over it. They had tried steel on some baggage cars, where tin had been cut by cinders. They were now trying some galvanized iron roofs. The steel roofs were put on just the same as tin; they were of galvanized steel.

Mr. FORD said that one great objection to the double-board roof had been that the nails worked out. He thought that much of that trouble might be prevented by bracing the roof so as to make it stiff and strong.

Mr. ADAMS believed in the tin roof. In many cases too heavy tin was used and it was not put on right. Good roofing tin, well put on, with a good, stiff sub-structure, would last six or seven years, except occasional holes made by the carelessness of trainmen. Much trouble would be saved if roofs were inspected oftener and repairs made when needed. Too heavy tin at the joints would crack and break.

Mr. KIRBY said that the great point was to have the work well done, no matter what kind of roof was used. He had had a great deal of trouble with poor roofs in cars built by contract. He was putting on tin and the Winslow roof. No roof would last if it was not well put on and properly braced.

Mr. ADAMS had repaired leaky board roofs by taking off one course of boards and putting on tin. He did not oppose the double-board roof where lumber was cheap.

Mr. COULTER used a double-board roof. He had tried screws and found they broke at the end of the thread. He now used wrought nails, putting up the holes.

Mr. HEMPHILL said that on the Toledo, Peoria & Warsaw they had many bad roofs from contractors. He now used a double-board roof, putting felt and painting between the courses and using screws.

The PRESIDENT then read the following question: What is the relative duration in different sections of the country of the different woods used in car construction?

The PRESIDENT said that this was an important question. He had found the best white-wood from Michigan, the best oak from Massachusetts. Michigan oak was too often cut when the sap was in it.

Mr. HACKETT had used Western and Virginia oak and found the Virginia lumber much the best, tougher and more durable. It was always cut in the winter.

On motion of Mr. C. A. SMITH the Committee on Train Brakes was continued another year; also the Committee on Inspection and Small Repairs of Freight Cars.

On motion of Mr. ADAMS the constitution was amended by making the day of meeting the second Tuesday instead of second Wednesday of June.

The Committee on Subjects for Next Annual Meeting presented its report, which was received. The report recommended the following subjects for investigation and report by committees:

1st. On the best diameter for cast-iron and steel-tired wheels.

2d. To recommend a form and the dimensions for a standard draw-bar and draw-springs, and the best method of bringing about uniformity in their length and construction.

3d. To investigate and report whether it is desirable and economical to apply brakes to all the wheels of freight cars, and the best way of bringing about uniformity in their construction, and to recommend forms and proportions for standards for those parts of brakes which require most frequent renewal.

4th. To investigate the causes of accident to trainmen, and report what means can be provided to protect them and yardmen from injury while engaged in the performance of their duties, and that the Yard-Masters' Association be invited to communicate with this committee.

5th. To investigate and report on the present construction of screws and nuts used on cars and the amount of accuracy that it is desirable to secure, and the best means of maintaining it in the standard adopted by this Association some years ago.

The Committee to Nominate Officers presented a report recommending for President, M. P. Ford; Vice-President, W. W. McWood; Treasurer, B. K. Verbruck; Secretary, C. A. Smith. The Committee stated that Mr. Garey desired to be relieved. Messrs. Ford and McWood declined, and after a general expression of confidence in the old officers, they were re-elected as follows: President, Leander Garey; Vice-President, M. P. Ford; Treasurer, B. K. Verbruck; Secretary, C. A. Smith.

The Committee on Resolutions presented resolutions of thanks to Senator Wagner for the use of sleeping cars; Superintendent Burroughs, of the New York Central, for the inspection of the Central shops and yards, and to the proprietors of the International Hotel. They were passed.

The PRESIDENT appointed as the Committee of Arrangements for next convention Messrs. W. B. Snow, B. K. Verbruck and John Kirby.

Mr. FORNEY moved that the Committee on Subjects be requested to solicit from members and others questions for discussion at the next convention; the Committee to be authorized to select and present such questions as they may think desirable for consideration, and to invite members to open the discussion of the questions presented. Also, that the President be added to the committee.

The Association then adjourned to meet at Chicago on the second Tuesday in June, 1879.

Rights of Travelers in Sleeping and Drawing-Room Cars.

Several gentlemen have recently been taking lessons in jurisprudence on the subject of the rights of passengers who ride in the drawing-room or sleeping cars. As instruction in jurisprudence is expensive when taken in the first instance, and as the subject naturally concerns a large class of travelers, we give our readers the benefit of what the aforesaid pupils of the courts have learned.

These cars are not, as a general thing, a part, properly, of the railroad train. They do not belong to the railroad company. There may be exceptions on some roads; but for the most part the drawing-room cars and sleeping cars belong to a separate company. The Pullman Palace Car Company is the prominent owner of them. The general arrangement between the railway company and the company owning the palace car is, that the railway company agrees to draw the car over its road, and allow the palace car company to let its seats and berths to the passengers who want them. But the railroad company has no share or interest in the charges of the car company for its extra accommodations, and the car company has no part in the fare charged by the railroad for transportation.

One question of interest is as to whether a passenger can be compelled to pay the extra charge for the palace car. This is the point involved in an actual suit now pending. The passenger bought the regular railroad ticket only, tried for a seat in the ordinary passenger car, but it was full. Then he established himself in the drawing-room car, and refused to get out or pay extra. He said that the railroad company was bound to give him a seat, and if they could not furnish it one car he would take it in another. The conductor put him out, and he brought an action, which is not yet finally decided. Of course, a railroad company is under obligations to make judicious and reasonable provision for giving seats in ordinary cars to passengers who have paid the regular fare, but if a company has not done this, or if on a particular day there is an unexpected rush of passengers, and all cannot be seated, there seems little doubt that a dissatisfied one should wait for the next train, or ride standing, and sue the company which sold him his ticket for damages. He cannot force his way into a vehicle owned by another corporation, and insist on riding in that merely because it happens to be coupled on the same train.

Suppose a passenger buys a palace-car ticket and loses it; what happens? Transportation companies have a right to prescribe reasonable regulations to prevent people from stealing rides; and a rule requiring them to buy tickets has been adjudged to be reasonable, so that a person who will not buy and show his ticket can be put off the train. And if he has bought it and cannot produce it, the conductor is not bound to take his bare word for it. But sometimes he can give proof. This was what occurred in Reed's case. At the depot in Chicago he bought a sleeping-car ticket to Crestline. He hunted up his berth and showed his ticket to the porter. Then he went to another part of the car, and there he had the ill-luck to lose his ticket. Accordingly when the conductor came Reed could not produce it. He referred the conductor to the porter who had seen the ticket, but the conductor would not take the porter's word for it. The cars had not started, so Reed went back to the ticket-seller in the depot, and got a note from him certifying that he had sold the ticket to Reed. Conductor would not take this, either. Said he must have "the money, a ticket or a pass." "Well," said Reed, "I propose to ride right here, in this berth." Conductor grabbed him by the collar and hauled him back into an ordinary passenger car, where he rode all night. Next morning his ticket was found at the other end of the sleeping car, where he lost it. Reed sued for damages, and the jury on the first trial awarded him \$3,000. The Supreme Court of Illinois set this aside. They adjudged that as the passenger showed the conductor clear proof he had bought a ticket and lost it, he ought to have been allowed to occupy the berth, and should not have been put out of the car; but that \$3,000 was extravagant damages. All he could recover was the dollar and a half he paid for the ticket, and some moderate compensation for any trouble or inconvenience arising from being deprived of his berth.

Whether a passenger can hold the company liable if his apparel, watch or money is lost while he is asleep, is a question that has arisen more frequently. Three or four decisions have been rendered, all to the general effect that the car



PASSENGER STATION ON THE PENNSYLVANIA RAILROAD AT RAHWAY, NEW JERSEY.

Designed by Joseph M. Wilson, C. E.

company is not liable; the passenger must take care of his own baggage. There was Smith who "turned in" in the Pullman car between Chicago and St. Louis with \$1,180 in his vest pocket, and put the vest under his pillow; but in the morning the money was gone. There was Welch, riding between Detroit and Buffalo, who lodged his overcoat in the vacant berth overhead, and could not find it next day. There was Blum, who lost \$3,185 between Columbus and Memphis in precisely the same way as Smith, except that Welch got up in the night to get a drink of water, whereas Smith kept his head on his vest under his pillow all night, or said he did. In all these cases the courts decided that the car company is not responsible for the passenger's baggage, because the company does not profess to take any charge of the man's clothes, or watch or money, or valise, or umbrella, etc.; he is supposed to keep them in his own care. Generally, indeed, the palace-car ticket has a notice on it to this effect. The lawyers argued that the companies were liable as carriers. But the courts decided the palace-car company is not a carrier; the railroad company does the carrying; all the palace-car undertakes is to let the passenger a special seat or berth, while he is on the way. Then the lawyers propounded a theory that the companies were liable as inn-keepers! But the courts said (in effect) that this was nonsense.—*New York Times*.

Contributions.

The Size of Steam Ports.—Combustion and Locomotive Practice.

TO THE EDITOR OF THE RAILROAD GAZETTE:

If it were only possible to know with how much energy your expression of views upon "Valve Gear" in a recent issue of the *Gazette* would operate upon the minds of the average master mechanic it would be easily determined how soon to follow it up with another dose; but, judging from an interview had a few days ago with one, at which the subject of port dimensions among other things, was mentioned, it would appear that the sooner the better:

Let it be assumed that an equivalent of 120 locomotives pass through a tunnel one mile in length every 24 hours. The amount of fuel consumed would approximate 7,500 lbs., and estimated at 92 per cent. carbon, or say 7,000 pounds carbon, generating 225,000 cubic feet of noxious gas per day; from which it will be seen that it is a task of considerable dimensions, and it is thought that but little benefit would result by or through the operation set forth in the "instructions," if the process of combustion, as given in our text books, is correct and substantially as follows:

Carbon combines with no more than 2% its weight with oxygen.

Hydrogen exists in a gaseous state and combines with 8 times its weight of oxygen.

Air consists of oxygen and nitrogen in proportion of 1 pound of oxygen to 3.29 pounds of nitrogen.

Every pound of coal requires 2.66 pounds of oxygen for its saturation; therefore, for every pound of coal burned 8.75 pounds of nitrogen must pass through the fire without combining with it, so that 16 to 18 pounds of air are required for every pound of coal burned.

The process of combustion in a locomotive furnace may be divided into three stages or conditions:

- 1st. An excess of coal.
- 2d. That of nearly perfect combustion.
- 3d. An excess of air.

Now it is not disputed that certain of these or intermediate stages may be found when the admission of air through the furnace door would decrease the amount of noxious gases discharged through the smoke-pipe; but that this condition is of long duration, that the fires of two locomotives in succession during any one day, or that the means are available and methods of manipulation for determining the amount of decrease in noxious gases by the manner proposed in "in-

structions" (arbitrarily, without reference to the work being done by the engine, or the condition of the fires in the furnaces of each at the time of their arrival at the tunnel) is, and the "instructions" are, eminently absurd. That it is a much easier matter to point out existing errors than to propose or institute proper reformatory measures is well understood, and it may be with misgiving that a "practice" contrary to "instruction" is proposed; but when any one fact has been so clearly demonstrated as is that of the decrease of noxious gases in proportion to the degree of proximity to perfect combustion, it is thought that if all fires should be in as good condition as possible on arrival at the entrance of tunnels, that no fresh coal be put on while in, and a state or stage of perfect combustion be maintained during the transit, that less annoyance from noxious gas would be experienced.

It may not be required of any master mechanic that he be familiar with the dynamic theory of heat (although the essential principles of it have become as well established as any other known or accepted law of physics), or the atomic formulas, chemical equivalents, or the volume of the products of combustion of various materials in pure oxygen;

but there are certain general principles of physics which form the basis of locomotive furnace construction, which may be in a general way enumerated, such as the laws of transfer of heat, the temperature of the products of combustion, and the laws of conduction, radiation, contact, convection, and the average percentage of carbon in the fuel generally used, the volume of atmospheric air necessary to be admitted, and what disposition of dampers and doors would be productive of the best fires, and these, if properly understood, would advance the interests of the motive power department of any railway company in the right direction.

Again, according to a report from the daily papers, a committee of the Pennsylvania Railroad Company is made to

say that from the information they were supplied with, it does not appear that the rolling stock department has too many officers, and that those were not overpaid; which is doubtless quite true. But an examination of their published reports of expenses of rolling stock will show a very large expense per mile for repairs of locomotives, and it is believed to be much larger than the average. There also appears a difference in the proportion of expenses of engines and cars as compared with other roads, as per following table:

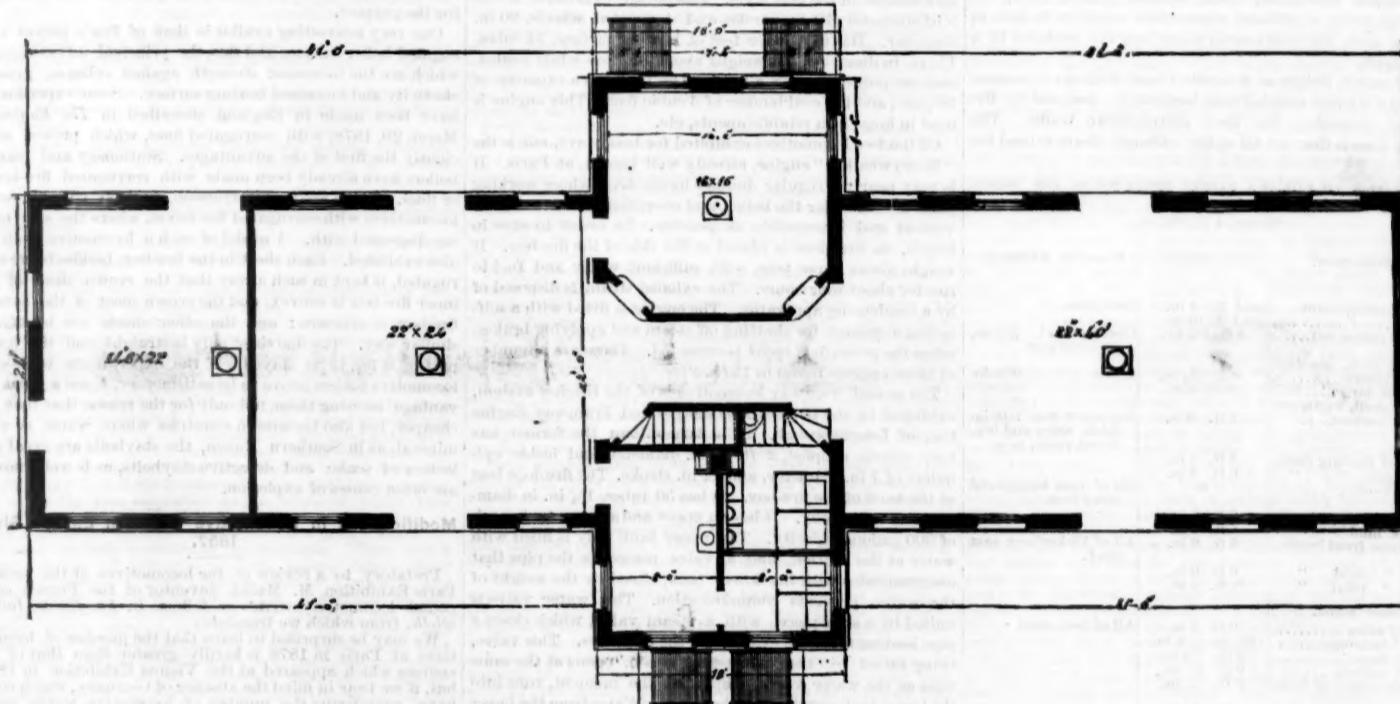
	Expenses for repairs of—	
	Engines.	Cars.
Pennsylvania Railroad.....	\$1,569,380	\$444,400
Philadelphia & Reading, 1878.....	336,577	812,017
do 27 years.....	8,982,477	{ Freight, 12,602,871 Pass., 5,018,344
All New York roads, 1876-77.....	4,162,985	2,008,458
N. Y. Cen. & Hudson River, 1876-77.....	955,294	726,297
Del. Lack. & Western, 1874.....	475,887	404,549
" 1875.....	429,701	368,965
" 1876.....	182,258	424,498
" 1877.....	183,798	407,460
N. Y., N. H. & Hartford, 1876.....	282,445	

—from which it appears that the Pennsylvania Railroad Company expended nearly four times as much for power as for cars, while the other examples (which may be taken as representative roads) show a much larger amount expended on cars than on locomotives, or their average expense per mile run for repairs of engines, was for the

New York Division.....	5.58 cts.
Philadelphia "	3.95 "
Pittsburgh "	6.59 "
Middle "	3.71 "
Tyron "	5.36 "
Philadelphia & Erie Railroad—	
Eastern Division.....	4.05 "
Middle "	6.64 "
Western "	5.35 "

—or a general average of 5.15 cents per mile.

In conclusion it may be said that for many years the locomotive has remained practically unchanged in all except size and in form and proportion of the minor details, and there



PLAN OF PASSENGER STATION AT RAHWAY, NEW JERSEY.—(See Page 336).

or you might do what Mr. John S. Gilbert did, who, after signing a contract in which was included the driving of some 3,000 piles, was informed by the Chief Engineer of the Navy Department that the maximum depth to which piles could be driven was 15 feet with a one-ton hammer, which Mr. Gilbert says appeared to him like trying to drive a 6-inch spike with a jack hammer, and he substituted one weighing two tons. (Try the same experiment please.)

It was thought that to "wire-draw" steam was one of the practices that "were" but are no longer admissible in average engineering practice; yet it was stoutly maintained that reducing the size of the ports was an equivalent for "wire-drawing" at the throttle, but that the results obtained were quite the reverse. Now it is not possible for some of the master mechanics to determine what sized ports are correct for a given service under given conditions; what size of journals for tender axles, etc., etc.?

Notice, if you please, page 486 of your issue for Nov. 2, 1877, where will be seen "Instructions to Engineers," and as the subject of tunnel ventilation is of increasing importance to eruditely master mechanics, its further consideration is proposed.

It is generally believed that pure air contains 3½ parts of carbonic acid in 10,000, the percentage of oxygen and nitrogen being respectively 21 and 79 by volume. The combustion of fuel in locomotives gives rise to carbonic acid, carbonic oxide, sulphurous acid and, if the fuel contains hydrogen, to water by the combination of various elements with the oxygen of the air. One pound of carbon generates 31½ cubic feet of noxious gas. In the case of complete combustion this is carbonic acid containing 31½ cubic feet of oxygen; but when the combustion is incomplete the result is carbonic oxide containing 15% cubic feet of oxygen, which was probably the "gas" the "instructions" were intended to dispose of.

It may not be required of any master mechanic that he be familiar with the dynamic theory of heat (although the essential principles of it have become as well established as any other known or accepted law of physics), or the atomic formulas, chemical equivalents, or the volume of the products of combustion of various materials in pure oxygen; but there are certain general principles of physics which form the basis of locomotive furnace construction, which may be in a general way enumerated, such as the laws of transfer of heat, the temperature of the products of combustion, and the laws of conduction, radiation, contact, convection, and the average percentage of carbon in the fuel generally used, the volume of atmospheric air necessary to be admitted, and what disposition of dampers and doors would be productive of the best fires, and these, if properly understood, would advance the interests of the motive power department of any railway company in the right direction.

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The Paris Exhibition.

PARIS, June 16, 1878.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Although the British section, by its size and variety, takes the lead among all foreign countries exhibiting at Paris, there is, in the machinery department, very little novelty to attract special attention from a railroad man. The seven locomotives, two of which are for tramway service, are sufficient, however, to make a specialist acquainted with some of the important types of English locomotive-engineering. Most of them are specimens of excellent workmanship, and aside from their general design, which differs considerably from the American system, and, for well known reasons, could never be adopted in America, they have carefully ar-

ranged details, and to me they appear the neatest locomotives of all those that are exhibited. There is one thing, however, that I cannot help making a note of. This is, that half of them have a simple bushing, no straps, on the parallel connecting-rods. Cheapness is probably the object; but I hardly think it an advantage, knowing that some American master mechanics have had to replace the simple bushing by straps and keys on their locomotives. The use of cast iron has not made any progress, and wrought iron or steel is used as formerly.

An express locomotive, constructed by Messrs. Sharp, Stewart & Co. (Limited), of Manchester, occupies the first place, at the end of machinery hall. It has two inside cylinders, 18 in. in diameter and 25 in. stroke; 4 coupled wheels, 6 ft. 6 in. in diameter, and two leading wheels, 4 ft. in diameter, with a rigid axle. The smallest diameter of the boiler is 4 ft. 1 in., the boiler shell being $\frac{1}{2}$ -in. iron plates. Inside the fire-box is of $\frac{1}{2}$ -in. copper plates, the fine sheet being $\frac{1}{16}$ in. thick. The 219 tubes are of brass, $1\frac{1}{2}$ in. in diameter, and 10 ft. 6 in. long.

The total heating surface is 1,239 square feet, 105 being in the fire-box. The area of grate is 17.7 square feet. The Allian link motion is used, and the reversing is done by means of a hand-wheel and screw—a better arrangement than the lever, as the cut-off can be more minutely regulated. There are no pumps, but two injectors. The axle-boxes of the leading wheels can slide laterally in guides that secure them to the frame, thus reducing the rigid wheel-base. A hydraulic brake is applied to the drivers. Bessemer steel is freely used on this as well as on other locomotives exhibited. The much larger heating surface of the tubes on this boiler than on an American boiler of the same size is obtained by diminishing the diameter of the tubes and packing them more closely; whether this is an advantage I should express my doubt, because, judging from certain experience, a sufficient water-space ought to be left, in order to have the evaporated water quickly replaced by a fresh supply.

The London, Brighton & South Coast Railway Company exhibits a 6-wheel coupled tank locomotive, designed by Mr. William Stroudley, for their metropolitan traffic. The novelty here is that not all of the exhaust steam is used for

creating draft, as only part of it goes to the chimney and the remainder is carried off by a pipe to the tank for heating the water. This engine has inside cylinders with 18 in. diameter and 20 in. stroke. Its total weight, when loaded, is 24.7 tons almost uniformly divided among the three axles. The diameter of the wheels is 3 ft. 11 $\frac{1}{2}$ in. The total heating surface is 525 square feet, 55 being in the fire-box. The area of grate is 10 square feet; capacity of tank, 500 gals., and that of the coal bunker, 11 cwt. The heaviest train worked by one of this class of engines, upon a gradient of 1 in 100, exceeded 200 tons, which represented a train of 36 cars, part of them being loaded. The working parts of the first engine of this class, after running 185,446 miles, are exhibited as being yet in an excellent condition. The reduction of the thickness of tires is $\frac{1}{4}$ in. per year, which represents 25,292 miles.

Another 6-wheel coupled saddle-tank locomotive is exhibited by Messrs. Fox, Walker & Co., of Bristol. It has outside cylinders 18 in. in diameter, 20 in. stroke; 3 ft. 6 in. diameter of wheels; has 480 square feet of heating surface, 98 fire-tubes $1\frac{1}{2}$ in. diameter and 8 ft. 5 in. long. The fire-box is of copper $\frac{1}{2}$ in. thick. Diameter of boiler, $34\frac{1}{2}$ in., and thickness of iron plates, $\frac{1}{2}$ in. It has one pump and one injector. Loaded it weighs 22 tons; the capacity of the tank is 500 gals., and of coal bunker, 30 cwt. It does not possess any novel features, nor is it worthy of a special attention. (Photograph inclosed.)

Next comes the Fairlie patent locomotive, with a single boiler and one pair of cylinders. It is very much the same as the double-truck locomotives built by Wm. Mason, of Taunton, Mass.

The smallest of all is the tank locomotive called "Mignon," for 3-foot gauge, exhibited by Black, Hawthorn & Co., of Gateshead-upon-Tyne. It is handsomely designed, and finished in the best style. Has outside cylinders; 5 in. diameter, 10 in. stroke, and 4 coupled wheels, 20 in. diameter. Has 67 square feet of heating surface, 31 tubes, 13 $\frac{1}{2}$ in. in diameter. It weighs about 8 $\frac{1}{2}$ tons when loaded, and can pull 60 tons on a level. The tank has a capacity of 50 gals., and the coal bunker of 3 cubic feet. This engine is used in large iron establishments, etc.

Of the two locomotives exhibited for tramways, one is the "Merryweather" engine, already well known, at Paris. It is very nearly a regular dummy locomotive, whose working parts are all under the boiler, and everything made as inconvenient and inaccessible as possible. In order to save in length, the fire door is placed at the side of the fire-box. It weighs about three tons, with sufficient water and fuel to run for about four hours. The exhaust steam is disposed of by a condensing apparatus. The engine is fitted with a self-acting appliance for shutting off steam and applying brakes, when the prescribed speed is exceeded. There are a number of these engines in use in Paris.

The second tramway locomotive is of the Hughes system, exhibited by the Hughes Locomotive and Tramway Engine Co., of Loughborough. It is larger than the former, has four wheels coupled, 2 ft. 6 in. in diameter, and inside cylinders of 7 in. diameter, and 19 in. stroke. The fire door is at the back of the fire-box. It has 50 tubes, 1 $\frac{1}{4}$ in. in diameter and 4 feet long. It has an upper and a lower tank, each of 300 gallons capacity. The upper tank only is filled with water at the station, and a valve placed in the pipe that communicates with the lower tank, closed by the weight of the water, prevents communication. This water valve is united by a solid piece, with a steam valve, which closes a pipe leading from the exhaust of the cylinders. This valve, being raised by the exhausting steam, opens at the same time as the water valve, which, at the moment, runs into the lower tank, condensing the steam. Water from the lower tank is used to feed the boiler. None of the exhaust steam goes into the chimney. The engine is all covered and weighs about 6 $\frac{1}{2}$ tons in working order.

Aside from the locomotives described, and the Saxby & Farmer's signals there is not much worthy of special attention. Some car wheels with wooden centres, which are coming into extensive use in England and with which the Pullman palace car exhibited (already in position next the Philadelphia & Reading locomotives outside of the building) is fitted, are shown in a model and in full size. The wood is held in position by the tire on one side by a projection from the tire, and on the other side by a metallic ring, which is secured by bolts and nuts to the projection. There is thus no novelty in the fastening, but only in the material being wood.

The Sheffield and other steel makers exhibit samples of their different stocks in a rough state or worked into springs, tires, wheels, etc. Among exhibits of various tools, I have noticed several with the name of Sellers, whose excellent tools seem to be well known in Europe.

In the way of rails, there is but one new invention, exhibited by the patentees, Messrs. Aldred & Spielmann. It is called "permanent way for steam and other tramways." It consists of a double rail, the object of dividing being to facilitate the laying down and taking up of the same, when re-laying is required. If the top of one rail is worn out, it can be replaced by the other—or reversed. The rails require no fastenings, aside from chairs, to which they are fastened by means of a wedge. The under side of the guard rail is suspended, and does not come into contact with the chair; thus its face is not damaged when reversed. The joints of the rails are broken in the chairs, but only half in one place. These rails are rolled from 30 to 84 lbs. per yard. It is claimed that the cost of this permanent way is considerably less than of any other system.

A model of an automatic coupling for freight cars is exhibited by F. Barnes, of Reading, which is one variety of the 100 different automatic couplings patented lately in Amer-

ica. There are several inventions for signaling between the passengers, guards, and the driver of a train. One, exhibited by R. Howarth, in a model, is very complicated, and doubtless will never be applied. Another, known as the Stewart flag signal, consists of a roller, with a flag placed inside at the top of a railway carriage. In case of an accident the passenger pulls a rope, and thus, by a mechanical arrangement, the roller is pushed to the outside of the carriage, and the flag unwinds itself. The outside signal is thus given. The same movement of the roller closes an electric circuit of a battery, placed in the guard's compartment. Two bells, one for the guard and the other for the driver, are ringing all the time when the electric circuit is closed, and this continues until the guard replaces the flag and roller in its proper place, which cannot be done by a passenger.

The London, Brighton & South Coast Railway exhibits an electric apparatus, patented by Stroudley & Rusbridge, for communicating between the passengers, guards and driver of a train. This apparatus has been adopted by the board of directors for the entire line, after several competitive trials. An electric circuit is also here the medium of an audible signal. In each compartment is a small instrument with a handle, or pull; the passenger, by pulling it, closes the circuit, and causes the bells to ring continually, the passenger not being to push the handle into the former position. The guard, finding the compartment from which the alarm was given, can break the electric circuit by pushing back the handle of the instrument with a key. The guards and driver can give signals to each other by ringing the bell once, twice, etc.

It is a valuable addition for safety on European railroads, where there is no communication between carriages, or compartments, to have any arrangement by which passengers can give an alarm; but in the United States, the simple rope that is easily reached by everybody is, I believe, sufficient for the purpose.

One very interesting exhibit is that of Fox's patent corrugated boiler furnace and flue, the principal advantages of which are the increased strength against collapse, greater elasticity and increased heating surface. Some experiments have been made in England (described in *The Engineer*, March 29, 1878) with corrugated flues, which proved sufficiently the first of the advantages. Stationary and marine boilers have already been made with corrugated fire-boxes or flues. There are in construction, or soon will be, some locomotives with corrugated fire-boxes, where the stay-bolts are dispensed with. A model of such a locomotive boiler is also exhibited. Each sheet in the fire-box, besides being corrugated, is bent in such a way that the crown sheet of the inner fire-box is convex, and the crown sheet of the outside fire-box is concave; and the other sheets are bent in a similar way. The flue sheet only is straight, and the lower part of it has to be stayed. If the experiments with such locomotive boilers prove to be satisfactory, I see a great advantage in using them, not only for the reason that they are cheaper, but also because in countries where water is very mineral, as in Southern Russia, the staybolts are great collectors of scale; and defective staybolts, as is well known, are often causes of explosion.

Modifications in Locomotive Types in Europe Since 1852.

Prefatory to a review of the locomotives at the present Paris Exhibition, M. Mallet (inventor of the French compound locomotive) writes as follows in *La Revue Industrielle*, from which we translate:

We may be surprised to learn that the number of locomotives at Paris in 1878 is hardly greater than that of the engines which appeared at the Vienna Exhibition in 1873; but, if we bear in mind the absence of Germany, which could have, considering the number of locomotive works, easily exhibited five or six engines (it sent 18 to Vienna), as well as the partial abstention imposed by circumstances upon Russia, which exhibited two locomotives in 1873, we will have to confess the number of 48 engines indicates a very favorable situation.

It is just to say that a certain number of the engines are for light service—street railroad engines, or even steam cars—but this extreme variety of types, which has not been shown before at any exhibition, is an additional element of interest.

Here we intend to study only the locomotives proper, and the engines which are sufficiently similar to be classed with them; but before commencing this examination we think it not without use to cast a retrospective glance on the preceding exhibitions in order to indicate, by this rapid examination, the importance of the one which now engages our attention.

If we leave aside the exhibition of 1851 at London and that of 1876 at Philadelphia, which, so far as locomotives are concerned, had not a sufficiently international character, the first one having scarcely anything except English and the second scarcely anything except American locomotives, we find that there were in 1855, at Paris, 20 locomotives; in 1862, at London, 21; in 1867, at Paris, 32; and in 1873, at Vienna, 47; the latter figure being almost identical, as we have said, with that of the exhibition of 1878. The following table shows the number of locomotives from each country at each exhibition.

	From	Paris, 1855	London, 1862	Paris, 1867	Vienna, 1873	Paris, 1878
Germany		5	2	5	18	
America				1		1
England		2	12	5	2	5
Austria		2	2	3	15	4
Belgium		3	1	5	6	6
France		8	3	15	3	25
Italy		1		1	1	1
Russia					2	
Sweden					3	
Switzerland					4	
Total		20	21	34	47	48

SPECIFICATION OF FAIRLIE'S PATENT SINGLE-BOILER AND DOUBLE BOOKE ENGINE.

Gauge, 4 ft. 8 $\frac{1}{2}$ in.

DESCRIPTION.	DIMENSIONS.	CLASS OF MATERIAL.
Two cylinders, diam.	1 ft. 4 in.	Cast iron.
Stroke.....	1 ft. 10 in.	
Diam. of piston rod.....	0 ft. 23 $\frac{1}{2}$ in.	Cast steel, piston, wrought iron.
Boiler barrel, smallest diam. inside.....	4 ft. 1 $\frac{1}{4}$ in.	Lowmoor iron, 9-16 in.
Length of barrel.....	10 ft. 6 in.	
Fire-box shell, width outside at bottom.....	3 ft. 8 in.	
Length of fire-box shell.....	5 ft. 1 in.	All of best hammered scrap iron.
Mean height,	6 ft. 4 in.	
No. of wheels.....	8	All of Vicker's ex. cast steel.
Diam. of driving-wheel.....	5 ft. 6 in.	
Diam. of hind	4 ft. 0 in.	
Wheel-base front bogie.....	6 ft. 6 in.	
" " hind	6 ft. 0 in.	
" " total	22 ft. 0 in.	
Front Bogie.		All of best steel.
Diam. of axles.....	0 ft. 6 in.	
" " bearings.....	0 ft. 6 in.	
" " boss.....	0 ft. 6 in.	
" " collars.....	0 ft. 6 in.	
Centre to centre of bearings.....	3 ft. 7 in.	
Total length.....	5 ft. 5 $\frac{1}{2}$ in.	
Hind Bogie.		
Diam. of axles.....	0 ft. 6 in.	
" " bearings.....	0 ft. 6 in.	
" " boss.....	0 ft. 6 in.	
" " collars.....	0 ft. 6 in.	
Centre to centre of bearings.....	3 ft. 7 in.	
Total length.....	5 ft. 5 $\frac{1}{2}$ in.	
Man driving crank-pin for driving-wheel.....	4 $\frac{1}{2}$ in. dr. \times 3 in.	Best cast steel.
Coupling crank-pin for other wheels.....	4 $\frac{1}{2}$ in. dr. \times 3 in.	Ditto.
Travel of valve.....	3 in.	
Lap.....	0 ft. 4 $\frac{1}{2}$ in.	
Lend.....	0 ft. 3-10 in.	
Area of steam port.....	15 sq. in.	
" exhaust.....	42	
" blast nozzle.....	11	
Diam. of chimney.....	1 ft. 3 $\frac{1}{4}$ in.	
Two No. 9 Giffard's injectors.....		
Diam. of safety valve.....		
No. of tubes in boiler.....		
Diam. outside tubes.....		
Thickness.....		
Fire-box, width inside at bottom.....	3 ft. 3 $\frac{1}{4}$ in.	Copper plate, $\frac{1}{16}$ in. thick, tube plate $\frac{1}{8}$ in. thick.
Length inside at bottom.....	4 ft. 10 in.	
Mean height.....	4 ft. 10 in.	
Heating surface tubes.....	1,022 sq. ft.	Naylor's patent. Solid drawn brass.
" fire-box.....	72	
" total.....	1,004	
Grate area.....	42	
Tubes, plates, copper, and iron.....	15 $\frac{1}{2}$ "	
Frames and stays strong in proportion.....		
Bogie frame.....	1 in. thick.	All of best Staffordshire iron.
Carrier frame.....	14 in. deep.	
The tanks carry.....	12 in. deep.	
Fuel.....	1,200 gallons.	
Centre of boiler from rails.....	3 tons	
Weight—empty.....	7 ft. 0 $\frac{1}{2}$ in.	
full	34 tons.	
	44 tons.	

Tractive force on rails (mean pressure 10 lbs.) 7,600 lbs.
Valve motion is of the same style as that on the Mason engine.

Before entering upon an examination of the progress made in locomotive construction shown by the exhibition of 1878, we will pass over rapidly the history of the successive conditions of this kind of engines as they have appeared at the different previous exhibitions.

We do not intend to go back to the origin of the locomotive, which would have no interest from our point of view. We shall take it only from the time when the equipment of the great French lines began to be organized, that is to say, from the time of the creation of the first great railroads, such as the Northern, whose rolling stock at that epoch served as an example for many others.

Then locomotives were divided into three classes: Passenger engines with independent wheels, mixed engines with two axles coupled, and freight engines with three axles connected. Soon there was added to them a pattern of express engines, that is to say, one with independent wheels of the largest diameter, which, in France and Germany, were often of the Crampton type.

All these engines were comparatively very light, for the first freight engines on the Northern Railroad weighed only $22\frac{1}{2}$ tons or $7\frac{1}{2}$ tons per axle. They had cylinders 15 in. in diameter, and with 24 in. stroke, and wheels 48 in. in diameter, and a boiler with 9 square feet of grate surface and 763 square feet of total heating surface. This pattern, soon seen to be insufficient in dimensions and stability, was in many cases replaced by the inside-cylinder pattern introduced on the Lyons Railroad, weighing $26\frac{1}{2}$ tons on the axles, with cylinders $16\frac{1}{2}$ x $23\frac{1}{2}$ in., and a boiler with 13 square feet of grate surface and 1,067 square feet of heating surface.

The London Exhibition in 1851 contained little but English locomotives intended for working the railroads of that country. They were, therefore, in general, engines for great speed—the "Lord of the Isles," broad-gauge engine of the Great Western, the Crampton Engine of Bury, the Stephenson Engine with false axle. On the Continent the tendency was different; the time was come when it was necessary to consider something besides speed.

In fact, the easiest lines had been made first, and as they were the most profitable it had been possible to reduce at great expense their grades to a few feet per mile, and to limit the curves to 2,300 or 2,600 ft. radius. But there were other lines to be made under less favorable conditions; districts with hilly surfaces were clamoring for railroads; at last we began to be engaged in connecting neighboring countries separated by high mountain barriers.

It was then (1852) that the Semmering competition came to attract the attention of engineers to the study of engines of great tractive power.

We know that at this competition four engines were offered, which we cite in the order of merit in which they were classed:

1. *Bavaria*, Maffei's engine with two outside cylinders, working four axles in two groups connected by an endless chain.

2. *Wiener Neustadt*, by Günther, with four outside cylinders working two trucks with two axles coupled, each under a single boiler.

3. *Seraing*, by the John Cockerill Company, with four cylinders working two trucks with two axles coupled under a double boiler.

4. *Vindobona*, by the Gloggnitz Works, an engine with two cylinders working four connected axles.

We may say that the Semmering competition was the point of departure for the study of engines of great power and low speed, and that for this reason it has a historical importance quite comparable to that of the famous trial at Rainhill in 1829; not that there was any result from the competition properly so called, at least immediately, since none of the engines tried then, though prizes were given, was adopted; but it was the occasion of the production subsequently of the Engerth locomotive, which played an important part during quite a long period. Moreover, it is proper to say that if the Semmering engines did not succeed, they none the less, deposited germs, some of which bore fruit afterward, as we shall see further on.

The exhibition of 1855, at Paris, was a pretty exact reflection of the then condition of the railroads. There was a certain number of powerful engines, among others three Engerth engines, one from Creusot, one by Cockerill, and one by Kessler, all intended for France. For it may be said that, with Austria, the country of the inventor, and Switzerland, which adopted this system for its Central and Eastern lines less perhaps because of its intrinsic value than for personal reasons, it is France which has made the greatest use of this kind of engines, which have been made in great numbers for the Northern, the Eastern, the Lyons and the Southern railroads, and even for one or two secondary lines.

There was likewise to be seen at the exhibition of 1855 an engine with eight wheels connected, the "Wien Raab," the first specimen of this kind of engine, such as it is now constructed.

By the side of these great freight engines figured the opposite type, the Crampton engine, in several specimens, some of the German ones having a forward truck.

Both types, after having played an important part, were to disappear afterward for very different reasons.

After 1855, following the current, the railroads which had not adopted the Engerth system made engines with four axles coupled, while others, recovering from their primitive infatuation, detached the engine from the Engerth engines, in order to make engines with eight wheels connected of them. This transformation occasioned discussions among eminent engineers, which will be found in the scientific papers of that day.

But the Engerth engine was condemned.

Really, is it not curious to see the Engerth engine, which was enthroned at the exhibition of 1853, after having supplanted the four engines of the Semmering competition, completely vanished to-day, so that not a trace of it could be found at the exhibition of 1878, though we see there, in examples or drawings, the Meyer and Fairlie engines (the first was at Vienna in 1873), which are the direct descendants of the "Wiener Neustadt" and "Seraing" of the competition of 1852? This singular coincidence is far from being unique.

The cog-wheel engine of Blenkinsop preceded adhesion engines; supplanted by them, in circumstances, it is true, where there was little reason for its existence, it is resuscitated, after fifty years of oblivion, by the Swiss engineer Riegenbach, and seems called this time to fill a fair career for special cases which are encountered more frequently than might be supposed.

Even the primitive crutch engine of Brunton figures, rejuvenated, at the exhibition.

We would deceive ourselves strangely if we were to see in these tricks of fortune nothing but fashion or caprice, though the construction of locomotives no more than anything else is exempt from infatuation—witness the *Coriassicus morbus* (Coriass disease) which at this moment is raging in the highest degree among European constructors. There is something more. The working of railroads forms a compact whole whose parts are strongly bound together. An isolated solution has little chance of success; it does not impress itself; it should come at the right time; the moment arrived, both doors are opened wide to it which a few years earlier

would have been left obstinately shut in its face. This is intelligible: difficulties in the use decrease with experience; certain inconveniences disappear in comparison with advantages whose importance increases with the circumstances. Hall's surface condenser had little success with low-pressure engines, for which it offered the minimum of advantages; we were very glad to take it up again when the use of high pressures had made the need of it felt.

We must avoid being in advance of our time. "God is on the side of the patient," says an Arabic proverb, which we have translated prosaically by "everything helps him who knows how to wait." Only, it is to be regretted that often the period of waiting surpasses the limits of human longevity.

In 1862, in London, we find an offshoot from the Engerth engine, the "Steindorff" engine, with its whole weight adhesive, and of great flexibility, engines with eight wheels coupled, Pétiet's four-cylinder engines for steep grades, which produced such a singular impression upon the English. There were to be seen there, likewise, isolated experiments, such as are found at all the exhibitions, experiments which, though not without merit, often leave no material trace, and disappear to be seen no more. These are comets of infinite periods in the firmament of locomotives.

The Steindorff engine reappeared at Paris in 1867, which did not prevent the abandonment of this type, since no more than two or three copies of it seem ever to have been produced, and that on a railroad where there were powerful personal motives to recommend it. At the same exhibition there was a four-cylinder engine of the Petiet pattern, but the other engines with great tractive power all belonged to the system with two cylinders and parallel axles, even the engine "Cantal," with five axles connected, which likewise seems not to have been copied more than twice.

The exhibition of 1867 likewise showed the very marked tendency to strengthen engines of the class which would have been called "mixed" under the old classification, and which are simply passenger engines intended for hauling heavy express trains rapidly, or for hauling ordinary passenger trains over roads with considerable grades. These engines have two axles coupled, carrying wheels of large diameter, reaching and sometimes exceeding two meters (6 ft. $6\frac{1}{2}$ in.), and weighing up to 33 tons. There was even an engine from the Southern Railroad with three axles coupled which could take, for passenger service, 5 ft. 3 in. wheels. This exhibition contained an engine from the St. Leonard Company at Liège, intended for a Spanish road, and provided with a forward truck or "bogie." This type of engine, which originated in America, is much used in Germany, and especially in Austria. At this exhibition appeared for the first time an engine from the United States, of the pattern classic in that country.

From the exhibition of 1867 dates the disappearance, at least officially, of the engine with independent wheels. This type appeared no more than at the English exhibition; but beyond the channel its existence was threatened.

At Vienna, in 1873, were found a considerable number of engines with four axles coupled, and of engines with two axles coupled and a forward truck. We may cite as exceptional the Meyer engine with six axles coupled, two trucks and four cylinders.

From this epoch the classification of locomotives has been clearly established. In hilly countries, for passenger trains, engines with six wheels connected are used; for freight trains, engines with eight wheels connected. In districts where the gradients are lighter, engines with four wheels coupled serve for hauling express and ordinary passenger trains; engines with six and eight wheels coupled perform the freight-train service, according to the gradients. Tank engines are employed by the great companies only for suburban or yard service, with some few exceptions. On the other hand, local roads use tank engines with six wheels coupled exclusively, for their whole service.

These arrangements, with loads of eight to nine tons per axle for the little roads and of 12 to 12 $\frac{1}{2}$ for the great ones, which are more and more making use of steel rails, make it possible to obtain an adhesive weight of 24 tons, at least, which may be increased to 50 tons, and consequently to realize a tractive power of 7,700 to 16,500 lbs., without needing to resort to special mechanical arrangements.

We have here sought only to trace roughly the general modifications which locomotives have undergone during a period of thirty years, leaving aside entirely the incessant progress in the details which successive exhibitions have continued to show us—progress in construction, properly so-called, in the apparatus of combustion, of making steam, of feeding, of distribution, etc., in methods of stopping and slowing, the naming of which alone would have led us into discussions inadmissible in a work of this kind.

There is, however, one point of view which we cannot pass over in silence, and that is the improvement of the locomotive as a steam-engine. Under this head we can note only a certain number of apparatus for a variable cut-off, that of Souyenbeck applied to the Koehlein locomotive in 1855, and the Guinotte cut-off exhibited on a Belgian engine in 1873. Neither of these arrangements have passed into use.

We now arrive at the exhibition of 1878.

According to a usage consecrated by several precedents, the official catalogues contain a summary note prepared under the direction of the Committee of Arrangements, which, after some statistical information, gives a view of the progress realized since the last exhibition.

This view is composed of a few lines only, which we reproduce:

"In locomotive engines, the progress is chiefly in the more extended use of engines with four wheels of large diameter connected, for hauling at great speed trains heavier than the old trains."

"If we enter into the details of the construction of the engines we shall notice:

"1. The substitution of steel for iron in a great number of the parts of the organism of the engines.

"2. The substitution of screw reversing gear for the reversing lever.

"3. The use of counter-pressure steam.

"4. Wrought-iron wheels stamped from a single piece.

"5. Finally, the fitting of grates for the combustion of fuel of every kind."

This notice prepared, as is seen, with extreme reserve, and expressed in the vaguest terms, seems not likely to shed much light on the salient features of the exhibition of 1878.

Terminal Charges and Discriminating Rates--Decision by the British Railway Commission.

The commissioners assembled on Friday, May 31, for the purpose of giving judgment in this case. Sir F. Peel said: Messrs. J. & F. Howard, the complainants in this case, claim a terminal allowance off the rates they are charged for their traffic to and from Bedford via the Midland Railway, in consideration of the terminal services as to their traffic being performed, not as usual by the railway company, but by themselves on their own premises, and by their own clerks and porters. They complain also of the railway company's rates upon their outward traffic, which they state were raised from Nov. 1 last, for no other reason than because the company received notice that the claim to a terminal allowance would be referred to us for decision. There

is a separate application against the London & Northwestern Railway Company, but the complaint is the same in both cases, and it was stated that unless there should be reason to suppose the facts to differ, our decision in the Midland case would probably make it unnecessary for the case against the other company to be brought on for hearing. The rates of the two companies for the conveyance of agricultural implements from Bedford station were raised on Nov. 1, but the rise was so considerable that Mr. Howard had to pay £160 for the carriage to Thurso of a traction engine and steam plough, which at the old rate would have been carried for £68, the rate per ton being raised from 75s. 10d. to 17s. 9d., and generally it was stated by Mr. J. Howard, that the new rate caused a difference to his firm of £1,500 to £2,000 a year. The new rates were made additionally prejudicial to the Bedford trade by being converted from the so-called carted rate into station rates, the effect being to deprive the consignor of the means of putting a price to his implements inclusive of delivery. It was declared at the same time, as a way of dealing with Messrs. Howard's claim, who paid terminal expenses, that the new rates did not include terminal services at Bedford, such as loading, and that for these, when performed by the company, there would be a further charge of 1s. per ton. These charges applied to no place but Bedford, and establishing, as they did, preferential rates as between other places on the lines of the two companies and Bedford, and doing this for no other purpose but to retaliate upon Messrs. Howard for claiming a terminal allowance, they were a distinct abuse of the powers entrusted to railway companies of regulating their charges for conveyance, an abuse indeed that was so plain that on the second day of the hearing the counsel for the companies informed us that, foreseeing we should have no alternative but to set aside such rates, he would not say a word in defense of them, and that the two companies advised by him had resolved to cancel them forthwith, and to readjust all accounts from November upon the footing of the rates which had been in force up to then, and which would at once be reverted to. This abandonment of each company of the rates so much complained of leaves only the question of a terminal allowance to be disposed of, and upon that point it will not escape notice that the November rates valued the station services saved to the company on Messrs. Howard's outward traffic at 1s. a ton. The Midland Company may charge in addition to the maximum charges in the 56th section of the Midland Railway (Leicester to Hitchin) Act, 1853, a reasonable sum for the expense of loading and unloading where such service is performed by the company. This extra charge is meant no doubt in the first instance for cases in which the company perform the duty of loading and unloading for other persons carrying goods on their line of railway. Messrs. Howard load their own goods, and they place the wagons duly loaded and labelled in sidings belonging to the company, and the only work of a terminal station which the company had to perform before such wagons leave the station is that of arranging them in proper train order. As to Messrs. Howard's inward traffic by the Midland Railway, four-fifths of it are of a kind, such as coal and pig iron, which companies do not unload for owners; but the unloading in Messrs. Howard's case taking place in their own premises, the wagons have to be hauled across from the company's goods station, and part of this haulage is done by the company's shunting engine, one hour per diem (representing a cost of 8s.), being the average time the engine is occupied. As to their other traffic in and out, the circumstances that they and the railway company have each a station at the same place undoubtedly saves the company some expense, particularly in portage, and, as we have seen, the company in November last valued this saving at 1s. a ton, and probably had any one complained that Messrs. Howard had an undue preference in being exempted from a 1s. terminal which was charged to others, the complaint could not have been sustained; but when we are asked to complete the difference it makes to the company of Messrs. Howard using their own station and of others using the company's station, we have to consider whether it is a contravention of the Traffic Act of 1854 if the company do not charge Messrs. Howard any less in consequence. There is first the difficulty that station expenses do not form an element of definite extra charge in every rate; it is far more usual for a company to undertake without exceeding its maximum to receive, forward and deliver for a rate which covers everything. It is, indeed, a usual provision of special acts that the rate per mile shall cover everything, although sometimes a company may, if it think fit, make a reasonable charge in addition for terminal services, as the Midland may at Bedford, for loading and unloading. But if a company does not avail itself of its statutory powers in this respect, and there is traffic which dispenses with part of what the company undertakes to do for uniform mileage rates for all traffic alike, must such rates be raised or lowered in proportion? We doubt if this would be required; and if so, and if there is no evidence that a particular rate is more than a mere mileage rate, or that there is any charge made besides mileage, is nevertheless the total amount which the rate comes to to be disintegrated, and a certain part of it summarily to be declared to be in charge for terminals? It is true that in the division of receipts from through traffic terminal companies are credited with an allowance for terminal expenses as well as with their mileage, but the amount the public pay is not affected by the principle on which companies choose to divide through receipts for traffic in which they are jointly interested; and we must be careful how we give occasion for these allowances, except so far as they may have express legislative sanction, being treated as sums which could be taken from the public, in addition to the mileage rate, to pay for the services they represent in respect either of through or of other traffic. But there is also the question, if it were necessary, to infer that there is a separate charge on traffic of some amount or other for station expenses. A case of undue prejudice under the traffic act could be established where the railway station is as available in all respects for Messrs. Howard's traffic as for that of others, and where Messrs. Howard use their own station in preference, not as the result of arrangements entered into between them and the company for their mutual convenience, but because it facilitates their own business, and because owners of land adjoining a railway possess the right of opening a communication with it. Local position gives to Messrs. Howard an alternative method of dealing with the receipts and delivery of their traffic, but they retain the right of using the company's station at any moment, exactly like other people; and, in fact, occasionally exercise such rights. It is not, however, necessary to pursue this point. It is enough for us to say that we do not consider the rates Messrs. Howard are charged to be such as we can divide in fixed proportions, and that station services to traffic conveyed, or about to be conveyed, upon a railway, seem to us so essential a part of a contract to carry, that a transport rate that does not discriminate between conveyance not including use of station, is not, in our opinion, unreasonable or unequal. We come then to the conclusion that the provisions of the act of 1854 are not infringed by the company not making any allowance to Messrs. Howard, and that the case is not one in which it is our duty to interfere. Having regard to the circumstances attending the alteration of rates attempted in November last, we think Messrs. Howard are entitled to the cost of this application.



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns our own opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

PROFITS OF THROUGH TRAFFIC AT CURRENT RATES.

The Lake Shore dividend is doubtless disappointing, especially to those who noted the statement in the last annual report that the net earnings had increased \$784,800 during the first quarter of this year as compared with last, and who hastily concluded that the increase for the year would be four times as much, and that this would enable the company to make a 6 per cent. dividend more than it made from the earnings of 1877. We took occasion then to point out that the large increase in net earnings was due, not so much to the fact that the profits were very large this year, as to the more unsatisfactory fact that they were extremely small last year at that time—the profits of the first quarter of the year—which was bad everywhere, and especially bad for the Lake Shore—actually being less than the interest accruing for the same time.

But thus, though, in spite of the large traffic of the winter—and the through winter traffic was probably much the largest in the history of the road—the profits for the first quarter of the year were by no means extraordinary, for the second quarter, as was to be expected, they were less favorable. As was to be expected, we say; for navigation opened the first day of the second quarter, and rates were reduced that day, and since have been, by the established tariff, lower than by any previous established tariff, and moreover have been "cut" freely below the established tariff. And this is the result, comparing the net earnings of the first and second quarters for a series of years:

	First quarter.	Second quarter.	Half-year.
1873.....	\$1,598,963	\$1,470,868	\$3,078,831
1874.....	1,701,227	1,590,039	3,291,265
1875.....	1,086,597	886,323	1,972,920
1876.....	1,229,853	1,224,302	2,454,155
1877.....	749,127	1,163,920	1,913,047
1878.....	1,633,927	937,286	2,611,213

Our figures, except for 1878, are taken from the published annual reports, in which earnings and expenses are stated exactly for each month, and not from the half-yearly statements accompanying the declaration of the dividends, which are usually made

before the half-year has closed, and in which, necessarily, the last month's earnings and expenses have to be partly estimated. And we have not reckoned taxes with working expenses; these have been at the average rate of very nearly \$40,000 per month every year for the past five years. For this reason we have added \$240,000 to the reported net earnings of the first half of this year, as these are expressly stated to be receipt less working expenses and taxes.

Thus really the second quarter of 1878 has been less productive than any preceding second quarter except 1875, and its net earnings are but about \$85,000 greater than the fixed charges and taxes accruing for the quarter.

The fact is thus developed that through traffic from the West to the East has been exceptionally unprofitable since navigation opened, and this is the matter of primary interest in this discussion. The results of so short a period as a single quarter are altogether insufficient for a criterion of the value of a property. If we were to conclude from the decrease of Lake Shore profits in the last quarter that it will earn no dividends hereafter, and that all the trunk lines will decrease dividends (some of these, unfortunately, cannot do this, a reduction below nothing being impossible even in railroad financing), we should make just such a mistake as we would have made had we assumed, when the profits of the first quarter of 1875 and 1877 were less than the fixed charges, that the Lake Shore Company was about to become bankrupt.

But it is well to fix attention on the unsatisfactory profits of this road for the quarter just closed. The traffic could not have been mended, and, though less than in the winter months, was doubtless considerably larger than last year. The trouble was not in the traffic but in the rates. The roads were indulging in the luxury of a contest with each other over the east-bound traffic—by far the larger part of their business. Most of it in that time they probably carried at less than the bare cost of transportation, leaving the much smaller west-bound traffic, on which rates—very moderate rates though—were maintained, and the local traffic, to yield the profits.

Last year was saved from being a disastrous one by the coincidence of a heavy traffic and remunerative rates during the entire last half of the year. Even the grain rate was made 30 cents per 100 lbs. from Chicago to New York on the first of July, and it was advanced to 35 cents on the first of September, and to 40 cents by the middle of October, while from the middle of August on the shipments were very large. Now there is every promise that there will be as much grain to move this next fall as ever before, but we caution the sanguine that it is not probable that as high rates can be got for carrying it. Last year the world was bare of wheat when the new crop was harvested, and it was obliged to have the grain and to have it at once. This forced the movement; the lake vessels and canal boats were fully employed and raised their rates, and it was easy enough for the railroads to get the prices which they asked. Now, however, the regular rate on grain is only 20 cents, and the railroads, recently, have been getting less of it than for several years; the world is pretty well stocked; prices of grain are low, and of wheat are going to be lower; when the new crop is ready consumers will take it at their leisure, as it were, and will not press it on the carriers except at favorable rates. At least, that is the present prospect. There may be even a heavier grain movement next fall than last; but there is no prospect that there will be as much profit in it. The railroads carrying through traffic to the seaboard are not going to make up their moderate profits of the first quarter of the year and their very light profits of the second quarter by very large profits in the third and fourth quarters.

For the six years past the Lake Shore's gross and net earnings have been divided as follows, between the two halves of the year:

	Gross earnings—	Net earnings—
	First half.	Second half.
1873.....	\$9,707,649	\$3,078,830
1874.....	8,651,504	\$2,580,081
1875.....	6,920,427	3,291,265
1876.....	7,513,772	2,702,495
1877.....	6,887,300	1,572,990
1878.....	6,461,167	2,329,778
	7,043,002	1,920,186
	6,063,318	1,913,047
	6,063,318	2,628,146
		2,371,913

For three years past, then, gross earnings have been largest in the last half of the year. In 1876, when there was a heavy freight traffic in the first half of the year, and the Centennial passenger traffic in the last half, and low rates half of the first half and nearly all the time during the second half, 50.7 per cent. of the gross earnings, but only 43.6 per cent. of the net earnings, were in the last half of the year. In 1877, however, when there was light traffic and low rates on most of it during the first half, and heavy freight traffic and remunerative rates during the second half, 53.2 per cent. of the gross earnings and nearly 58 per cent. of the net earnings were in the last half. Or,

putting it in a different shape, in 1876, in the first half, when there was a railroad war but about half the time, working expenses were 64.4 per cent. of the receipts, and in the last half, when there was a contest nearly all the time, and a larger traffic, they were 72.8 per cent.; and in 1877 in the first half, when most of the through freight traffic in both directions was carried at the war rates of 1876, working expenses were more than 70 per cent. of the receipts, and in the last half, when rates were well maintained in both directions, they were but 62.7 per cent.

Now there cannot be any such increase in profits in the last half of this year as there was last—and this is true of the parallel roads which depend largely on through traffic as well as of the Lake Shore—without a material increase in the rates on east-bound freight. Increase of traffic will not bring it. It is the 30, 35 and 40 cents per 100 lbs. that the railroads want, and it is plain to see that with as large a traffic or even a larger one after harvest this year, which is quite possible and even probable, last year's profits will not be made if the roads continue to make the rate 20 cents, to say nothing of occasional cuts. Probably, as we have said, last year's rates cannot be had, or not the highest of them; but something better than 20 cents, at least, can be had, and if it cannot, there is no prospect for profits from through traffic, and dividends and interest will have to be paid, so far as they are paid, by the local traffic, which has a right to claim that some part of this burden should be shared by the through traffic if there is any way of making it do so.

A NARROW-GAUGE CONVENTION.

It is announced in the daily papers that "A National Narrow-Gauge Railway Convention has been called to meet in the Grand Opera House in Cincinnati on the 17th of July next. The questions to be considered will embrace everything relative to the construction and operation of narrow-gauge lines and a comparison with the standard-gauge lines in economy and practical efficiency. The Executive Committee invite the attendance of all officers of narrow-gauge roads, built or projected, car-builders, manufacturers of rails, locomotive-builders and dealers in supplies, that a thorough investigation of the subject may be secured."

The names of the Executive Committee are not given in the notice published. They might give some better clue to the "true inwardness" of the proposed convention than is revealed by the above notice; but if "a thorough investigation of the subject" is to be secured, it is not clear why the "officers of narrow-gauge roads" only are invited to attend. To propose to investigate a subject thoroughly and then summons witnesses for one side only looks as if Justice in this case had removed the bandage from her eyes and lengthened the scale-beam at one end. A thorough investigation of the subject would, doubtless, do much good, especially if a report of such an investigation could be circulated among those who are interested in the narrow-gauge theories; and as a call like the above will doubtless lead many to attend who will go for the purpose of getting reliable information concerning the subject and who will not willfully shut their eyes to the truth, we will venture to suggest some questions for consideration at that meeting.

It should be said, in the first place, that the subject to be considered is a very important one, owing to the fact that there are so many sections of country which are unprovided with adequate means of transportation for their products, but which would, at least for some years to come, supply only a comparatively small amount of traffic for any road which might be built. If it is true that in such cases the cost of a railroad, suitable for such traffic, will be a third or a fourth less if the rails are put three feet apart than it could be if they are put the ordinary distance, or 4 ft. 8½ in., then it is the most important discovery in railroad engineering since the time when Stephenson made the successful trial with his locomotive Rocket.

Persons living in sections of country like that referred to will very naturally feel great interest in the subject, and it would be very easy to imagine the kind of questions which an ingenious person, without the required facilities for transportation, might entertain, and which he would bring to a narrow-gauge convention to be answered. We frequently have visitors of that kind, who, unfortunately, usually come with certain predilections which they have absorbed in favor of narrow-gauge theories. As the real questions at issue would be more forcibly and more clearly presented by the inquiries of such persons, a few of them might be summarized from many past conversations and stated formally for the consideration of the Cincinnati Convention. The interviews with inquirers after the truth of narrow-gauge doctrines generally begin somewhat as follows:

INDUCTORY.—“ My name is ——, I come from —— county in —— state. The section of country in which I live is not yet thickly settled, but all of the best land has been taken up and the population is increasing. At present we are obliged to carry all our produce and drive all our cattle from —— to ——, — miles to —— station on the —— railroad or river. We need a railroad to develop the country; but, as you can see, the business of such a line would at first be light, and therefore it would not pay interest on the cost of the road, unless the latter was very cheap. They tell me that a narrow-gauge road will cost only about two-thirds as much as one of the standard gauge, especially in a rough country like part of that through which our line must be built. What I want to get at is the real facts of the case in relation to the cost of such roads.”

The above, it is believed, truly represents the attitude of mind in which many persons have approached the narrow-gauge question, and will be that of some of these who will attend the convention to be held on the 17th, or who will watch its proceedings. If such persons are asked what reason there is for thinking that a narrow-gauge road will cost less than one of the standard gauge, their answer in most cases will be “ that the locomotives and cars for narrow-gauge lines weigh and cost much less than those for a standard gauge, and that the rails can be lighter; the road-bed is narrower, and shorter curves may be used if the rails are near together than are practicable with the standard gauge.” Any one who has been interested in the narrow-gauge question has heard these statements reiterated a hundred times. Now it is important, not only in the persons who are expected to assemble in Cincinnati on the 17th, but to the whole country, to know whether these statements are *true*. In view of this it might be said to our hypothetical inquirer that “ the cost of narrow-gauge locomotives or cars is no longer a matter of theory; it is a question of fact. Therefore, assuming that you honestly desire to know what is the truth with reference to it, we will suggest that you write a letter somewhat like the following, to several of the principal locomotive-builders in the country”:

“ We are seeking information concerning the cost of building a light railroad from —— to ——, and as the relative price of rolling stock for narrow and standard gauge roads will have some influence in determining what gauge should be adopted, will you please inform us what the difference will be in the weight and cost of locomotives of the same capacity, that is, to draw the same weight of trains over the same grades and curves, if built for a three-feet gauge road compared with those for a 4 ft. 8½ in. gauge?”

The replies to a letter of this kind from several leading locomotive-builders would determine the question of the cost and weight of locomotives beyond any possible room for doubt, especially if the manufacturers addressed have had experience in the construction of both kinds of engines.

But the inquirer usually says that “ the cars of a given capacity are said to weigh very much less in proportion to the load they carry, than the cars for a standard gauge do, and, therefore, in carrying a given amount of freight, the dead weight being so much less on the narrow than on the standard gauge, the total weight of train is less, and therefore the engines may be lighter, and consequently cheaper.”

This is very plausible, and has captured many converts to the new theories, and when this idea once finds lodgment it is difficult to displace it. The treatment of such cases, therefore, requires some care. Perhaps the best plan to adopt is to ask the inquirer whether he has seen the cars on the —— narrow-gauge road, and whether they would give the required facilities for the traffic on a road through the section in which it is contemplated to build a new line.

The reply usually is, “ O, yes, I have seen the cars; they are very nice, and would do very well for our business, although they only weigh about half what the cars on the Pennsylvania Railroad do, and only a quarter what the Pullman cars weigh.” The new convert is apt to gush a little here, but that may be quietly subdued by suggesting another letter to manufacturers of cars somewhat like the following:

“ It is proposed to build a light railroad in our section of country, and in order to aid us in determining what gauge to adopt, will you please inform us how much difference there would be in the weight and cost of such freight and passenger cars as you usually furnish for three-feet gauge roads, if they were built to run on a 4 ft. 8½ in. gauge track? That is, the bodies to be the same in both cases; the wheels, springs and side frames of the trucks to be of the same size; the only difference being that the axles and cross-pieces of the truck frames are to be lengthened and increased in section sufficiently so as to be of equal strength for each gauge.”

The opinions of experienced manufacturers with reference to this point should certainly be worthy of more credence than the testimony of projectors of lines who have money to make out of contracts. It might be well, however, to induce the manufacturers to give a detailed estimate of the difference in the cost, showing the amount of extra material and workmanship required, owing to the increased width of the gauge. If the convention in Cincinnati would make a comparison of this kind, it would be quite certain to be of interest and profit to many.

But our hypothetical inquirer will say, “ Is it not true that the rails may be lighter on a narrow than on a standard gauge?” The reply to this might be in the form of another question in this wise: “ With the same weight, would the strain on the base formed by the two rails be increased or diminished if the latter were spread apart?” Whether the weight resting on the base would be increased by widening it, the locomotive and car-builders will probably answer.

It will be said, though, that “ certainly a narrow road-bed will cost less than a wide one.” Let us see about that. The width of the road-bed at the top is governed by the length of the cross-ties, and not by the distance between the rails. The length of the latter is governed by the weight they must carry, and, therefore, if the cars and engines for the one gauge are of the same weight as those for the other, it will follow that the cross-ties must be of the same length. Therefore, the following question is suggested for the narrow-gauge convention: “ *How long are the cross-ties which are generally used on three-feet-gauge roads, and would it not be possible to lay the rails 4 ft. 8½ in. apart on such ties?* ”

Another question may, however, be anticipated from the engineer. He would say: “ If the rails are near together, curves of much shorter radius are practicable, and therefore the line can be adapted to the surface of the ground so as to require less grading?” This unfortunately has heretofore been made a question of theory and not one of fact, and usually those who have given an answer have grasped only a very small portion of the theory. It is suggested, therefore, that the convention in Cincinnati make this also a question of fact, and inquire, first, “ *What are the shortest curves used on the main lines of the present narrow-gauge railroads?* ” and, second, “ *What are the shortest curves used on standard-gauge roads?* ” Such data will be conclusive concerning the practicability of using shorter curves on narrow than on standard-gauge roads.

But in order to put the question of grading quite beyond the bounds of what may be regarded as theory, let any projected light railroad be located and the estimates be made for a road-bed for a standard gauge with cross-ties 1 ft. 8½ in. longer than those used for a 3 ft. gauge, if the former are considered necessary. Then invite bids from contractors for doing the grading. After these are received, ask the contractors at what rate per cubic yard they will do the work if the road-bed is narrowed 1 ft. 8½ in. If they agree to do it in each case at the same rate, it is certain that either the price in the one case would be too high, or else in the other it would be too low. Any persons about to build a road of this kind can make the test, or the question might be formulated as follows for consideration at the convention: “ *Can the grading of a road be done at the same price per cubic yard if the road-bed is narrowed 1 ft. 8½ in.?* ”

But the projectors of such roads are apt to say, finally: “ We can raise money easier to build narrow-gauge roads, than we can if we propose to make them of standard gauge.” This view of the subject might be presented to the convention by a question somewhat as follows: “ *Can the farmers and other residents along the line of a proposed railroad be induced to subscribe money easier if the truth or the reverse be told them?* ”

The Transportation Tax.

The railroads of the United States for which the last issue of “ Poor’s Manual ” has reports have in the aggregate 74,112 miles of road, with 18,000 miles of second track and sidings, or an average of 1.244 miles of track to one mile of road. They are equipped with 15,911 locomotives, 12,053 passenger cars, 8,854 other passenger-train (baggage, mail and express) cars, 392-175 freight and service cars. This property is represented by \$2,213,278,598 of stock, \$2,255,818,650 of funded debt, and \$237,804,774 of floating debt, if this latter can properly be said to represent the property. The total cost of roads and equipments is reported to be \$626,010,295 less than the sum of stocks and debts.

The earnings of these roads were \$472,909,272, their working expenses \$801,982,575, and their net earnings \$170,976,697. They paid toward the interest on their

bonds (the total of which accruing must have been as much as \$155,000,000) \$98,820,927, or at the average rate of 4.89 per cent. on the whole funded debt, and they paid as dividends on their stock \$58,556,312, or at the average rate of 2.53 per cent. on the total stock. The extortion practiced to secure these returns is not visible to the naked eye.

If this property were divided equally among the inhabitants of the United States it would give each man, woman and child about 9 feet of railroad, represented by \$50.29 of stock, \$49.03 of bonds and \$5.17 of floating debt, or \$104.49 in all. For short, we may say, that in this country about \$105 to each individual is invested in railroad property.

The average payment per individual for railroad transportation in 1877 was \$10.28, of which \$6.65 went to pay the bare expenses of conducting the business, and the other \$3.72 were for income on the investment. The average individual contribution to the extortioneers holders of watered and other stock was \$1.27; to the bloated bondholders, \$2.15.

The transportation tax, at least so far as it is incurred to pay the interest on the capital invested in railroads, can, therefore, hardly be called a very onerous one. Compared with the part that goes to paying working expenses, it is so small that the public is much more interested in the improvements of transportation which reduce working expenses than in any possible limitation of the profits of stockholders. Indeed, the saving that has been effected in the working expenses of the roads, per head of population, since 1873, considerably exceeds the amount paid in dividends in 1877. Thus:

	1877.	1873.	Dec.
Per individual:	\$6.56	\$8.16	\$1.60
Working expenses.....	1.27	1.60	0.33
Dividends paid.....			

Now, if the granger will go on cursing the stockholders because of the \$1.27 that they exact of him for the use of their property (though that is a fifth less than they used to get), let him at least bless the stockholders’ employés, who in four years have reduced his tax by \$1.60. He can now pay the stockholders and the expenses for less than it formerly cost to pay the expenses alone. Meanwhile let him remember that he is paying \$3.72 a year for the use of \$105 worth of property.

Poor’s Manual.

The “ Manual of the Railroads of the United States for 1878,” the eleventh issued by Mr. Henry V. Poor, the compiler, made its appearance June 29, which is about the usual time. The work has become so familiar to nearly all who have any occasion for such a compilation, and the numbers appearing from year to year have differed so little from one another, except in the greater or smaller number of companies and length of mileage for which they had reports, that usually we have not had much to say of it, except to repeat our conviction of its value, which we have very good reason to know, as the book is probably more used in this office than any where else in the world. The Manual is, in theory, a file of annual reports for all the railroads of North America. Practically, it is true, the file is imperfect, and it does not often, if ever, attempt to go back for more than ten years, and then only for the more important companies; and in a great many cases the reports are most unsatisfactory. But the compilers of a railroad manual cannot make bricks without straw any more than the rest of us; and the meagreness of many of the reports supplied by the companies is such that very little can be made out of them.

The Manual is probably most used by those who have occasion to investigate the facts concerning a single company at a time. These may be simply the facts shown in the company’s last annual report, and perhaps they most usually are. But even if the report contains all the facts, and is accessible (as usually it is not), it will not often serve the purpose as well. There is a certain system followed in the Manual in presenting the facts concerning a company and its workings, which, though not uniform (as it might be and should be if all the companies reported the same kinds of facts), still follows a general plan, which, once familiar, makes it easy to find any given fact, and this is not often the case with a company’s report, however complete, prepared as it usually is without an index. Suppose for instance that one wishes to investigate the position of the second-mortgage bonds of the Winona & St. Peter Railroad. Supposing him to know that there is no Winona & St. Peter report, that the facts are reported in the Chicago & Northwestern report, and that he has this latter document, still he will not be so likely to find at once the catalogue of securities, fully and clearly as it is given there, in the report as in the Manual, with which frequent use has made him familiar.

But if it is more convenient to refer to the Manual for the data of a single year, much more is it for the data of several years, for comparison or other purposes. In the first place, scarcely any one has files, except for a company by which he is employed or in which he has a special interest; in the next place, to compare files is extremely laborious and time-consuming labor, as we have good reason to know. As we open the new Manual we chance upon tables for the Pennsylvania Railroad, showing a large number of data—receipt, expense and profit per passenger and per ton per mile; train, passenger and tonnage mileage; earnings from the several sources; expenses under five heads; net earnings; the dispo-

sition of net earnings under five heads—and all this not for the last year or the last two years only but for ten years: a really invaluable store of information for many purposes, and especially so because it covers so many years, and so enables the student to ascertain tendencies, and so infer, with greater certainty, probabilities. It is true that not many companies are treated as fully, partly, doubtless, because few are so important, but partly, also, because from most the information cannot all be had.

The Manual is so largely used by those who search it for information concerning the finances of companies, and especially concerning the position of their stocks and bonds, that its usefulness would be much increased if in all cases it were stated what dividends have been paid every year that any were paid, and also what defaults, if any, have been made in the payment of interest on every class of bonds. This is not always nor even usually done in the Manual. For instance, in the very full account of the Pennsylvania Railroad, the rate of dividend is nowhere mentioned, except for the last year. The total amount paid in dividends is given for ten years; so that it is possible to calculate the dividend for any year for which the amount of stock is known. But this requires from the reader just the kind of work which a manual of reference should do for him. In some cases, however, the rate of dividend is given for as many years as the accounts are presented.

We have said that heretofore one issue of the Manual was so much like the others that a mention of the issue of a new volume was sufficient to describe it to those who use it. But this year there is an innovation. Instead of arranging the reports promiscuously, as they came in or were prepared, or rather not arranging them at all, this year the companies are classed by states and arranged alphabetically under each state. The states, however, are arranged in the conventional, or a conventional geographical order, beginning with Maine and going down the coast to Louisiana, going inland to take in West Virginia, Kentucky and Tennessee; then jumping back to Ohio and working westward and northward to Minnesota, thence taking the range of states on the west bank of the Mississippi and Indian Territory to Texas; then passing back to Nebraska and Kansas and taking all the territory west of them in its order.

There has been considerable criticism of the Manual heretofore for its lack of arrangement, but it did not seem to us to be a practical defect of much consequence. It is, perhaps, somewhat easier to refer to as it is, and would be still more so if the railroads of the country were arranged alphabetically as a whole, instead of by states. But in the state reports, like that of New York, in which the companies' reports are arranged alphabetically, we have usually found it easier to look up the page in the index. In the case of the Manual this year, the difficulty of finding any particular state, owing to the order adopted, is such that the reference to companies is not much facilitated.

If the Manual were a book to be read, article after article, a logical arrangement of some kind would be of the greatest importance. But it is no more read than a dictionary or an encyclopedia. When a comparison is made between two companies they are quite as likely to be in different states as in the same state. The main thing is to make the reference as easy as possible, first by the arrangement of the companies, and second by the arrangement of the data for each company; for it is quite common that the reference is made to find a single fact—last year's net earnings, the amount of second-mortgage bonds outstanding, the margin over fixed charges, the last board of directors, or something of the kind, and one does not wish to read the article through for that, but to find it and be gone.

A convenient feature in this changed arrangement is a table preceding the reports for each state in which are given the name of each company having road in the state, the gauge of its road, the total length of its road, and the length in the state in question. We notice a few errors in the statements of gauge, some of which have become traditional, as it were, being repeated in most lists of gauges. But this publication, and still more so the similar one in the *Official Railway Guide*, begun a month ago, will doubtless attract attention and correction. This is as desirable with the mileage as with the gauge, and it is to be hoped that officers of the several roads will notice these statements and send in corrections if they are not right. In this way we may some time know how much railroad there is in the United States. The statement is only approximative now, and errors are discovered every year. In the table of mileage opened each year, for instance, the Manual has made considerable changes this year. Thus the aggregate mileage at the close of each year is given as follows in the last two issues of the Manual:

	By Manual for—	1878.	1877.
1870.....	52,914	52,898	
1871.....	60,529	60,568	
1872.....	66,242	66,735	
1873.....	70,311	70,784	
1874.....	72,016	72,695	
1875.....	74,374	74,614	
1876.....	77,031	77,470	
1877.....	79,208		

It is one of the advantages of a periodical work of this kind that it can correct its errors, and thus become more and more exact year after year. But the correction would go on much more rapidly and be made more completely if those who note errors would call the publishers' attention to them. They do not often suggest themselves, but the corrections must be made with those specially familiar with the facts.

There is a change in the introduction as well as in the body of the book, but this is one which we do not look upon with so much favor. There were 52 pages in last year's introduction; in this year's there are but 10. The space is saved by omitting the long tabular statement of "mileage, equip-

ment, capital account, cost, operations, earnings and dividends" of each railroad separately, and of the aggregate in each state. This table took up a good deal of space, but it was very useful. Indeed, if it had been a little more complete it would have been a substitute for the body of the Manual for many uses, and extremely convenient for reference.

In place of it we have this year the aggregates for each state and group of states, but not the items for each road separately; the items are given again for the average 100 miles in each state and group of states. Here, by the way, in this table, we find the separate statement of the funded debt which we missed in our analysis of the introduction last week, and not only that, but a statement of the floating debt also, which we have not had before, and which was always a desideratum. It also gives the gross amount of interest paid on bonds, and of dividends paid on stock.

The new issue, having reports from 604 more miles of railroad, has increased the body of the work, containing these reports, from 960 to 1,027 pages, of the usual octavo form. It is well to say that it is not confined to the railroads of the United States but includes those of Canada. Most of these, apparently, are taken from the report to the Dominion Government, covering the year ending with June, 1877. Even the two great roads, which together work one-third of the total mileage of the Dominion, and report regularly every half-year to their stockholders, have their accounts ending with the first half of the year. These roads are so important connections of our own, that a review of American roads would be imperfect without them.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Rumford Falls & Buckfield.—Track laid from Canton, Me., westward to Rumford Falls, 14 miles.

Kings County Central.—Completed from Prospect Park in Brooklyn, N. Y., to a junction with the New York & Manhattan Beach road, 3½ miles. It is of 3 ft. gauge.

Central, of New Jersey.—Track laid on the Monmouth Park Branch, from the Long Branch Division to Monmouth Park, N. J., 1 mile.

Kendall & Eldred.—Track is laid from Eldred, Pa., east by north 4 miles, and from Kendall, N. Y., southwest 5 miles, making 9 miles in all. It is of 3 ft. gauge.

Springfield, Jackson & Pomeroy.—Extended by laying 32 miles of track between Waverley, O., and Greenfield, leaving only one mile to connect the two ends of the road. It is of 3 ft. gauge.

Denver & Rio Grande.—The *Garland Branch* is extended from Garland, Col., to Alamosa, 30 miles. It is of 3 ft. gauge.

Utah & Northern.—Extended northward to Portneuf Canyon, Idaho, 35 miles. It is of 3 ft. gauge.

This is a total of 124½ miles of new railroad, making 606 miles completed in the United States in 1878, against 618 miles reported for the corresponding period in 1877, 673 in 1876, 401 in 1875, 637 in 1874, and 1,408 in 1873.

THE LAKE SHORE DIVIDEND for the first half of 1878 is only one per cent., or half of what it has been usually for a few years, and, in view of the favorable statement made in the annual report of the first quarter's earnings, it is doubtless disappointing. But the net earnings of the first half-year, though small, are 24 per cent. greater than last year, and but little less than in 1876. As we have shown elsewhere, they were exceptionally small in the second quarter, the results of the first quarter not being maintained. But as they stood, the net earnings, after providing for all fixed charges, were at the rate of just 1½ per cent. on the stock. But \$280,000 have been absorbed in payments for additions to the property—desirable additions, too, which will be indirectly if not directly productive—and \$70,000 for the Ashtabula accident, and this leaves a very narrow margin of surplus over the 1 per cent. dividend. The results shown from the working of the half-year, and especially of the second quarter, are very interesting, as this is a typical road, and may be taken to represent the whole class of carriers whose business is largely the transportation of freight from the Northwest to the Atlantic ports. It shows plainly that the roads have been accepting too low rates recently. By the Lake Shore's statement for the first quarter, it appeared that it had earned \$3,590,874 at an expense of \$2,056,947, or about 57 per cent. Now, for the second quarter it has earned \$3,072,444 at an expense of \$1,195,258, or about 65 per cent.—this on the assumption that \$240,000 of the "operating expenses and taxes" reported for the first half of this year have been taxes, which has been the proportional amount for the period very nearly, for five years past. It is true that expenses are not likely to be evenly divided among the different quarters of the year, but it is true also that the increase in the percentage of expenses from 57 to 65 per cent. must have been chiefly due to the lower rates received on through east-bound traffic.

MR. VANDERBILT'S LETTER, published last week, in which he expressed his approval of the principle of traffic apportionment among competing roads to prevent undue reduction of rates has been endorsed by most of the trunk-line managers, and seems generally to have had a very good effect, as it creates confidence in the conservative and just action of Mr. Vanderbilt at a time when his control of the Michigan Central gives him new and great power in dealing with some of his rivals. It seems to be conceded that this will not be used for the purpose of shutting any of the New York Central's rivals out of the market; and doubtless the power can be made most valuable to the New York Central

by a policy which will likewise profit the other trunk lines, that is, by preventing irregular action and cutting rates, and compelling, so far as possible, the lines which reach the Northwest over the Michigan Central and the Lake Shore to pay full rates for the use of these roads at least. A great deal of complaint has been made in the past—how well-founded we cannot say—that rates were usually broken by lines working over the Michigan Central, and if the quarrels which have arisen from this cause or pretence can be suppressed by the new management, one great danger will be overcome.

LAKE AND CANAL RATES are at the lowest point in their history. Last year, when they were lower than ever before, 1½ cents for corn from Chicago to Buffalo and 4 cents for wheat were the lowest prices touched, and that only for a single week, and we find no quotation less than 2 cents by lake and 4½ by canal, and the average of the season was 4.5 cents for wheat and 3.9 for corn by lake, and 10 cents for wheat and 8.7 for corn by canal—rates becoming actually higher after July and so bringing up the average above that of the previous year. Now wheat is taken from Chicago to Buffalo at 1½ cents per bushel and corn at 1½ cents (the latter for two weeks past), and the rates from Buffalo to New York by canal are 4½ for wheat, 3½ for corn and 2½ for oats. At this season most of the shipments both years have been corn, which is now taken from Chicago to New York at 5½ cents a bushel plus the cost of the Buffalo transfer, which is, we believe, about half a cent more. The lowest rate in any week last year was 6 cents, the lowest lake rate not falling in the same week with the lowest canal rate. Including the elevator charge, the water rate is equivalent to just about 10 cents per 100 lbs. from Chicago to New York, under which circumstances it is encouraging to see that the railroads are taking very little through grain.

Rahway Passenger Station.

With this number of the *Railroad Gazette* we give a full-page prospective view of one of Mr. Joseph M. Wilson's admirable designs for a railroad station, which has been built at Rahway, N. J., on the line of the Pennsylvania Railroad. The design is very plain, with hardly any decoration, but enough has been added to change the appearance of the building from that of a mere rectangular structure to a thing of beauty. It is an example of what may be done with a station of this kind, without any features in its construction excepting those which have a purely utilitarian character, simply by ornamenting the construction. Mr. Wilson has the rare qualifications for this kind of architecture of having a thorough training as an engineer, combined with good taste and without any of the wretched affectations which make so much of the work of architects who have given their attention chiefly to decoration and little to the art of good building so nauseating.

The engravings will give a better idea of the appearance and plan of the building than would be possible by a description. The face walls are built of pressed bricks with joints penciled black; the belt courses, window sills, chimney caps and arch stones of windows and doors are of Ohio sandstone. "The fronts are relieved with black bricks, made by heating and dipping in coal tar." Minton's encaustic tiles have also been used in the brick work and have an excellent effect.

Besides the architectural or decorative features the clause in the specifications that "small ventilating flues shall be built from each water-closet, starting from bottom of joist, and be carried to the roof," is especially worthy of imitation in structures of this kind.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Empire Transportation Company, special meeting, in the Board of Trade Rooms, Philadelphia, July 9, to consider arrangements for the final dissolution of the company and the disposition of its remaining effects.

Dividends.

Dividends have been declared as follows:

Chicago, Rock Island & Pacific, 2 per cent., quarterly, payable Aug. 1. At the same time a 2 per cent. dividend has been declared on the stock of the leased Iowa Southern & Missouri Northern, which is held by the company in trust for the stockholders. The proportion of this for each share of Rock Island stock is 0½ per cent., making the actual dividend to be paid 2½ per cent.

Lake Shore & Michigan Southern, 1 per cent., payable Aug. 1. Transfer books will be closed from July 5 to Aug. 5. The company paid 2 per cent. last year.

East Pennsylvania (leased to Philadelphia & Reading), 3 per cent., semi-annual, payable July 15.

Pittsburgh, Ft. Wayne & Chicago (leased to Pennsylvania Company), 1½ per cent., quarterly, on the special guaranteed stock, payable July 1; the same on the guaranteed stock, payable July 2.

Little Schuylkill (leased to Philadelphia & Reading), 3½ per cent., semi-annual, payable on demand.

Housatonic, 2 per cent., quarterly, on the preferred stock, payable July 15.

Foreclosure Sales.

The St. Louis Tunnel Railroad was sold in St. Louis, July 1, under foreclosure of the mortgage of 1873, the bonds and unpaid coupons amounting to \$1,500,000. Bought for \$450,000 by Charles E. Tracy, acting as agent for the bondholders. The road extends from the west end of the St. Louis Bridge to the Union Depot.

The sale of the New Jersey West Line road, which was to have taken place June 29, at Newark, N. J., has been postponed for four weeks, to July 27.

A Narrow-Gauge Convention.

A National Narrow-Gauge Convention has been called, to meet in the Grand Opera House, Cincinnati, O., July 19. The questions to be considered will embrace everything relating to the construction and operation of narrow-gauge

lines, and a comparison with standard gauge lines as to economy and practical efficiency. The Executive Committee invites the attendance of all officers of narrow-gauge roads, built or projected, car-builders, locomotive-builders, rail-manufacturers and dealers in supplies, that a thorough investigation of the subject may be secured.

A similar convention was held in St. Louis, in June, 1872.

ELECTIONS AND APPOINTMENTS.

Anderson, Lebanon & St. Louis.—At the annual meeting in Anderson, Ind., June 28, the following directors were chosen: J. A. Goldsberry, A. O. Miller, F. H. Messick, Thomas Tettters, W. H. Castor, W. R. Pierce, E. P. Schlater, J. A. Larned, G. B. Gerard, L. A. Millbank, A. B. Stone, F. B. Loomis, U. F. Rogers. The board elected L. A. Millbank President; W. R. Pierce, Vice-President; E. P. Schlater, Secretary and Auditor; W. T. Rogers, Treasurer; J. A. Larned, Superintendent.

Atchison, Topeka & Santa Fe.—Mr. George B. Lake, formerly Division Superintendent, has been appointed Superintendent of Bridges, Buildings and Track, in place of Mr. J. D. Burr, who is appointed First Assistant Engineer on construction of the several lines now being built in Colorado and New Mexico. Mr. J. M. Meade retains his position in the Department of Bridges and Buildings, as Assistant to Mr. Lake. These changes took effect July 1.

Baltimore & Ohio.—The following circular is dated June 26:

"Mr. W. C. Quincy has resigned the office of Superintendent of the Central Ohio, Lake Erie and Straitsville Divisions of the Baltimore & Ohio Railroad, to take effect July 1, proximate."

"Mr. Charles H. Hudson, in addition to his duties as Superintendent of the Chicago Division, is hereby appointed Superintendent of the Central Ohio, Lake Erie and Straitsville divisions."

Mr. Hudson who has been for a year or two Superintendent of the Chicago Division, was formerly for many years on the Chicago, Burlington & Quincy.

Boston, Hoosac Tunnel & Western.—Mr. W. P. Granger has been appointed Chief Engineer. He was formerly for a long time Chief Engineer of the Troy & Greenfield road.

Bureau of Statistics.—Mr. Joseph Nimmo, Jr., who has been at the head of the Bureau of Internal Commerce since it was organized, and as such issued a very valuable report on transportation, has been appointed Chief of the Bureau of Statistics, in place of Dr. Edward Young.

Chesapeake & Ohio.—A Richmond telegram of July 1 says that a preliminary organization of the new company has been completed with the following officers: President, C. P. Huntington; First Vice-President, A. S. Hatch; Second Vice-President, Williams C. Wickham; Engineer and Superintendent, W. M. S. Dunn. These are the officers of the old company, except the First Vice-President, which is a new office.

Chicago, Burlington & Quincy.—Mr. Paul Morton is appointed Assistant General Freight Agent, in place of J. F. Goddard, who has gone to the Atchison, Topeka & Santa Fe. Mr. J. L. Lathrop has been appointed Assistant General Auditor, in charge of the accounting office at Chicago.

Mr. J. Q. A. Bean has been appointed General Eastern Agent, with office in Boston. Mr. Bean was formerly General Freight Agent of the Michigan Central, but resigned that position on account of ill health, and has since been General Eastern Agent for the same company.

Columbus & Maysville.—At the annual meeting in Hillsboro, O., May 27, the following directors were chosen: C. S. Bell, Benjamin Barrere, David Noble, John H. Jolly, Hillsboro, O.; M. Anderson, Washington Court House, O.; Eli Johnson, Leesburg, O.; Aaron Seymour, Bainbridge, O.; T. M. Barrett, Rainsboro, O.; John Kibler, Taylorsville, O.; H. N. Kennedy, Sardinia, O.; Chilton A. White, Georgetown, O.; Lee Kendall, J. C. Leggett, Ripley, O. The board elected C. S. Bell President; Thomas Hibben, Secretary; E. L. Ferris, Treasurer; Fred J. Picard, Chief Engineer.

Flint & Pere Marquette.—The new board has elected Jesse Hoyt President; W. W. Crapo, Vice-President; H. C. Potter, Secretary, Treasurer and General Manager.

Foxburg, St. Petersburg & Clarion.—Mr. B. B. Newton has been appointed Superintendent, in place of John Graham, Jr., resigned, with office at Foxburg, Pa. He has been Supervisor of Roads since the completion of the road.

Huntingdon & Broad Top.—Mr. Wm. Barker is appointed Master Mechanic, in place of W. W. Collier, deceased. Office at Saxton, Pa.

Kansas Pacific.—Division Superintendent J. T. Odell has been transferred from the Kaw Valley to the Denver Division, in place of C. W. Fisher, resigned. Division Superintendent J. C. Brinkerhoff is transferred from the Smoky Hill to the Kaw Valley Division, and S. R. Ainslie, late Agent at Denver, is appointed Superintendent of the Smoky Hill Division.

Long Island.—Mr. J. L. Morrow has been appointed Superintendent of the Atlantic Division, to take effect July 1. He has been connected with the Chesapeake & Ohio as Division Superintendent for several years.

Massachusetts Railroad Commission.—The Governor of Massachusetts has appointed Edward W. Kinsley, of Boston, a member of the Railroad Commission, in place of Francis M. Johnson, of Newton, who retires on account of ill health.

Minneapolis Belt.—The first board of directors is as follows: Frederick Butterfield, Richard Chute, S. H. Chute, Gottlieb Schobert, M. C. White. The officers are: Richard Chute, President; M. C. White, Vice-President; Samuel H. Chute, Secretary and Treasurer. Offices at Minneapolis, Minn.

Minneapolis Eastern.—The directors of this new company have elected Joel B. Bassett President; Carroll T. Hobart, Vice-President; Charles A. Pillsbury, Secretary.

New York, Lake Erie & Western.—Mr. Charles Neilson, Fuel Agent, was placed in charge of the Fuel Department of this company, on and after July 1, 1878. His office will be in New York.

Ohio State Inspector of Bridges.—Railroad Commissioner Bill has appointed Wm. Larwell, of Cyrus, Inspector of Bridges, in place of Wm. J. Jackson, resigned.

Oregon Steam Navigation Co.—At a meeting of the board of directors, held June 1, Capt. George J. Ainsworth was appointed Assistant General Superintendent.

Paulding & Cecil.—At the annual meeting, June 27, the following directors were chosen: E. S. Dix, C. L. Noble, S. R. Matt, A. H. Selden, Isaiah Richards, M. N. Ulrey, George W. Potter. The board reelected S. R. Matt President; A. H. Selden, Secretary; George W. Potter, Treasurer.

Peninsular, of Virginia.—This company was organized under a charter from the State of Virginia at a meeting held in Drummondtown, Accomac County, Va., June 18, when the following directors were chosen: John S. Bates, O. H. Brown, U. H. Painter, Wm. Painter, W. U. Schoolfield, C. M. Schott, W. E. Ward. The board elected Gen. Wm. Painter President.

Powell's Valley.—The incorporators met at Jacksboro, Tenn., June 17, and elected officers as follows: J. S. Lindsay, President; J. H. Claiborne, Vice-President; Wm. Allen, Secretary; Frank Kincaid, Treasurer.

St. Paul & Sioux City.—Mr. J. C. Boyden, General Freight and Ticket Agent, will hereafter be General Freight Agent only, having been relieved of the duties of the passenger department at his own request. Mr. W. H. Dixon is appointed General Ticket and Passenger Agent.

Savannah & Charleston.—Mr. John F. Blacklock has been appointed Treasurer, in place of S. W. Fisher, deceased. Mr. J. Moultrie Lee has been appointed Auditor.

Shore Line.—At the annual meeting in New Haven, Conn., June 27, the following directors were chosen: S. B. Chittenden, W. F. Day, Samuel Hemmingway, H. L. Hotchkiss, Edward Ingraham, C. G. Landon, E. H. Trowbridge. The board reelected S. B. Chittenden President; S. Hemmingway, Vice-President; W. F. Day, Secretary and Treasurer. The road is leased to the New York, New Haven & Hartford.

Union Pacific.—It is said that General Superintendent S. H. Clark, will be General Manager of the pooled lines, the Union Pacific, Kansas Pacific and Colorado Central.

Wabash.—Mr. F. Lockwood, for some time in the Auditor's office, has been appointed Traveling Auditor.

PERSONAL.

—Mr. Henry B. Hammond, General Manager of the Boston & New York Air Line and President of the Indianapolis, Decatur & Springfield, has been chosen a member of the Board of Fellows of Bates College at Lewiston, Me.

—Mr. John Graham, Jr., Chief Engineer of the Foxburg, St. Petersburg & Clarion road, and Superintendent of the road since its completion, has resigned and will go to Virginia to take charge of some engineering work there.

—Mr. John B. Jervis, of Rome, New York, one of the fathers of the American railroad system, and one of the oldest and most honored of our engineers, and still active with his pen, was given the degree of LL.D., by Hamilton College at its commencement last week.

—Gen. Fitz Henry Warren, an old and prominent citizen of Burlington, Ia., died last week while on a visit to Springfield, Mass. He had been in feeble health some time. He settled in Burlington in 1845 and soon became prominent in business and politics, holding several state offices, and also that of Assistant Postmaster-General under President Fillmore. He served during the war with the First Iowa Cavalry, and was promoted to the rank of Brigadier and Brevet Major General. He was for several years Minister to Guatemala, and after retiring from that position was actively engaged in the construction of the Burlington, Cedar Rapids & Northern and the Burlington & Southwestern roads. For some years his health forced him to remain chiefly in the East, though he regarded Burlington as his home.

—Hon. J. D. Cox, formerly President and Receiver of the Toledo, Wabash & Western, has declined a renomination to Congress from the Toledo District in Ohio.

—Mr. Bruce H. Kidder, at one time Master Mechanic of the Michigan Southern & Northern Indiana road, died June 19 at Pekin, N. Y., from the effects of a surgical operation which was resorted to as a last chance for his life. He was a Major in the Union army, and his death was the result of a wound received in the service.

—Mr. E. R. Dorsey, Assistant General Ticket Agent of the Baltimore & Ohio, resigned July 1, and will take a position on a Southern road.

—President Garrett, of the Baltimore & Ohio, has gone to England on a visit, and various rumors are current as to his business there, the chief one being that he has gone to negotiate a loan.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Five Months ending May 31:

	1878.	1877.	Inc. or Dec.	P. c.
Dakota Southern ...	\$86,344	\$65,724	\$20,620	31.4
Mobile & Ohio ...	846,003	737,900	1,108,193	14.7
Nash., Chat. & St. L.	730,140	683,555	1,36,585	5.3

Month of May:

Central, of Iowa....	\$62,842	\$45,355	L. \$17,487	38.5
Dakota Southern....	19,039	16,347	1,692	16.5
Mobile & Ohio....	104,231	95,401	8,830	9.3
Nashville, Chatta. & St. L....	124,837	128,647	D. 3,810	3.0

Third Week in June:

Denver & R. Grande....	\$19,039	\$14,174	L. \$4,865	34.3
Southern....	68,000	76,437	D. 8,437	11.0

Week ending June 21:

Gt. West., of Can....	\$71,927	\$74,104	D. \$2,177	2.9
Grand Trunk.....	\$142,906	\$155,754	D. \$12,848	8.2

Week ending June 22:

Grand Trunk.....	\$142,906	\$155,754	D. \$12,848	8.2
Total.....	414,168	404,865	D. \$8,097	16.3

Of the receipts this year 185,617 bales were consigned to Norfolk and 228,551 to points beyond.

Eric Canal.

The business of the canal at Buffalo from the opening up to June 30 was as follows:

	1878.	1877.	Increase.	P. c.
Boats cleared.....	2,906	1,394	1,512	108.0
Tons received.....	\$204,621	\$88,714	\$115,907	130.7

The canal opened April 15 in 1878 and May 8 in 1877, the report thus including 76 days in 1878 and 58 in 1877.

Coal Movement.

Coal tonnages for the week ending June 22 are reported as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Anthracite.....	401,258	430,364	D. 38,106	8.7
Semi-bituminous.....	65,356	64,065	L. 391	0.6
Bituminous, Pennsylv'a.	38,789	33,162	L. 5,627	16.9

There is said to be an opportunity of introducing Ameri-

can anthracite in Italy at a fairly remunerative price. Italy has no coal and has hitherto been supplied from England.

It is expected that there will be a suspension of mining in the Schuylkill anthracite region, as the July allotment to the Reading Company is only about one-half the capacity of the region. It is stated that the Reading will advance its tolls to \$1.75 for Philadelphia city trade, with 20 per cent. off to iron works; freight and tolls to Port Richmond being put at 40 per cent. of price of coal, the minimum to be, for coal for shipment to eastern points, \$1.50 per ton for stove and \$1.30 for other sizes, and to southern points \$1.50 on stove and \$1.40 on other sizes.

Water Rates.

There is still another reduction in lake and canal rates, though the change in lake rates affects but a small part of the shipments. Corn from Chicago remains at 1½ cents per bushel to Buffalo, but wheat freight has fallen from 1½ to 1¼; at Milwaukee the rate of 1¼ for wheat is maintained.

The reduction in canal rates is general, and the figures quoted last Monday were 4½ cents for wheat, 3¾ for corn, and 2½ for oats from Buffalo to New York.

Ocean rates, on grain at least, seem not to vary much. Monday's quotations from New York to Liverpool by steam were 4½ d. per pound for cotton, 2s. 9d. per barrel for flour, 7½ d. to 8d. per bushel for grain, 45s. per ton for cheese, 32s. 6d. per ton for bacon and lard, 45s. per ton for leather; by sail to London flour was taken at 2s. 3d. per barrel, wheat at 8½ d. per bushel, other grains at 7½ d., measurement goods at 18s. per ton; to Cork for orders there were charters from New York at 6s. per quarter for grain and at 6s. 3d. from Baltimore, and from San Francisco at 57s. 6d. to 60s. per bushel.

At San Francisco ships with 9,700 tons capacity are reported ready for immediate loading with wheat, and some 20,000 tons available for new crop shipments. Several charters are reported to load with new-crop wheat for English ports at 60 shillings per ton.

Grain Movement.

Receipts of grain of all kinds at the eight Northwestern markets for the week ending June 22 are reported as follows, for five years, in bushels:

	1878.	1877.	1876.	1875.	1874.
2,296,402	2,475,641	3,886,980	2,621,882	5,132,166	

The receipts of Northwestern markets this year for the week are the smallest since the middle of March, yet but little less than the receipts of the previous week.

The shipments of the Northwestern markets for the same week have been:

	1878.
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THE SCRAP HEAP.

Railroad Manufactures.

The Taunton (Mass.) Locomotive Works are building some engines for the Colorado Central road.

The Wason Car & Foundry Co., at Chattanooga, Tenn., is building some freight cars for the Atlanta & Charlotte Air Line.

The Pomeroy Iron Co., of Pomeroy, O., has made an assignment for the benefit of its creditors. The liabilities are stated at \$70,000; assets, the rolling mill, real estate and outstanding accounts.

The Paxton Rolling Mill, at Harrisburg, Pa., recently made for exhibition a plate of $\frac{3}{8}$ -in. iron 65 ft. long and 20 in. wide, weighing 1,900 lbs.

The Union Iron Mills, of Carnegie, Kloman & Co., at Pittsburgh, have been making a number of 12-in. girders $4\frac{1}{2}$ ft. long, weighing 1,783 lbs. each. They are to be used for bracing three large melting furnaces.

The Helmacher Forge & Rolling Mill Co., at St. Louis, has an order for 2,000 car axles.

The Standard Steel Works, in Philadelphia, have a large order from the Pacific Coast.

John A. Decker & Co., of Philadelphia, have a contract for 15 stations on the New York Elevated road.

The Pittsburgh Manufacturer says that the buildings, tools, etc., of the National Locomotive Works of W. H. Baily & Co., at Connellsburg, Pa., were sold by the sheriff June 25, and bought for \$2,500 by E. K. Hyndman, Superintendent of the Pittsburgh Division, Baltimore & Ohio Railroad. The works have a capacity of 25 engines a year and were thought to be worth at least \$40,000. It is proposed to organize a stock company and start up again.

Bridge Notes.

The Leighton Bridge & Iron Works, at Rochester, N. Y., have the contract for an iron bridge 1,200 ft. long, in 17 spans, over the Wisconsin River at Merrimac, Wis., on the Chicago & Northwestern.

The Detroit Bridge & Iron Works have orders for 29 spans of railroad bridges, besides some roof and turn-table work. The forge making car axles.

The first bridge made by the new Morse Bridge Works, at Youngstown, O., was shipped June 15. It is a highway bridge, 91 ft. span, and went to Kittanning, Pa.

The Philadelphia Times report that Mr. John H. Dialogue, owner of the ship-yards at Kaighn's Point, N. J., has secured a contract to build a large bridge in Vermont.

R. F. Hawkins & Co., of Springfield, Mass., are building a riveted lattice highway bridge to go to Mittineague, Mass.

Notes.

Did the prophet Isaiah ever eat at a railroad station? It certainly looks so, for how could he describe it so literally if he had not? "And he shall snatch on the right hand and be hungry; and he shall eat on the left hand and then shall not be satisfied."—Congregationalist.

The first rule of the Baggage Department on a road running into New York is as follows: "Baggage-masters, in dealing with the public, are required to be at all times courteous and gentlemanly in their deportment, remembering that politeness costs nothing and is one of the essential requirements of the company. A soft answer turneth away wrath, but a grievous word stretcheth up anger." A very good rule, and one that it would be well for the public to observe also in its dealings with baggage-masters, who are a much and often unjustly abused race.

As two tramps were being put off a train on a Western road the other day, one of them fired his revolver and killed a train boy. The passengers at once raised a purse, paid their fare as far as they wanted to go and presented them with the surplus, which amounted to \$218.61, as a slight testimonial of their gratitude.

When a Brooklyn man has nothing else to do he organizes a company to build a new railroad to Coney Island. The region between Brooklyn and the Island will soon, at the present rate of progress, be a wilderness of tracks, with no room left for even a dwelling house or a highway road.

Fast Time.

The Toledo Blade of June 28 says: "The fastest time ever made on the Lake Shore road was the run from this city to Cleveland yesterday of the Vanderbilt train, consisting of two cars and an engine, the Franklin, No. 151, run by Burt Hodges, the best engineer on the road. They left Air Line Junction at 12:51 and made the remarkable time of 108 miles in 106 minutes."

Couldn't Stand the Pressure.

A colored tramp, who was hanging about the depot a day or two since, was observed to disappear round the corner whenever a passenger train drew up, reappearing only as it departed. It looked suspicious, and a special policeman pounced upon him as he returned from one of these semi-occasional excursions, and demanded what he was "up to." "Are you keeping shady from a constable? or don't you want to go till a freight train comes along?" he asked. The wanderer proceeded to elucidate: "Yer see, boss," said he, taking another reef in his trousers waist-band, "I hain't had nuffin to eat worf mehshunin since las' night; and every time dat de cars pulls in de boy at de hotel ober dar by de perivylum—he trots out and beats de gong for dinner, and I tells you, boss, it makes me feel jus like I was goin' to cave in, an' I can't stand pressure, nohow." He let him go.—Binghamton Times.

Passenger and Freight Engine Bells.

The Railway World says: "A number of locomotives of various shapes and composition have recently been cast at the Altoona shops, from which selection will soon be made for the purpose of finally establishing a marked distinction between the sounds produced, respectively, by the bells of freight and passenger engines. A corresponding distinction will also probably be made in the sounds produced by locomotive whistles. The success of this undertaking will manifestly render good service by enabling railway employees and the general public to distinguish the character of an approaching train while it is still at a considerable distance, and valuable inferences may often be drawn from this information. The period is probably near at hand, when a bell of long, clear and pleasing reverberation, or other marked characteristics, will apprise all whom it may concern that a passenger train is approaching or passing; while a heavier, duller and more business-like sound will give notice of the movement of a freight-train. In the bells already cast, marked variations of sound have been produced by slight changes in the composition, shape, or distribution of metal. One bell, containing five parts of copper to one of tin, is in the key of A, and another bell of the same composition, but with slight variations in the shape or distribution of metal, is in the key of B flat. Various other compositions and modifications have been tried, which have produced such good results that between the sounds of several of the classes there is a contrast that any ear of average power could readily distinguish."

British Rail Exports.

Exports of railroad iron of all kinds in the month of May to all countries were 40,463 tons in 1878, against 64,333

in 1877. The average value per ton was £8 3s. 3d. this year, and almost the same last year.

For the five months ending with May 196,607 tons were exported this year and 184,510 last, the increase being nearly 2.0 per cent. The exports to the United States for the five months and for May have been:

May.....	18	1,522
Five months.....	152	2,483

The total exports to this country this year would not suffice for two miles of track.

Rail Consumption in France.

In France, in 1877, the railroad companies purchased 48,888 tons of iron rails and 136,549 of steel rails. Compared with the consumption of the previous year there was a decrease of 15 per cent. in the iron and an increase of 4 per cent. in the steel rails. The total production of rails in France was 73,202 tons of iron and 184,663 of steel, thus considerably exceeding the consumption.

Tramps.

The tramp is getting to be numerous in Illinois and apparently does pretty much as he pleases. The Peoria Transcript of June 25 says: "Last Wednesday a party of 200 boarded the Jacksonville Branch of the Chicago & Alton Railroad at St. Louis and rode to Jacksonville 'on their cheek.' At that point, on Thursday, they struck a Wabash freight train going west, and got on board. The train officials sought the assistance of the Jacksonville police, but this did not help matters any, as the police could do nothing and the tramps proposed to 'have a free ride in spite of police, train-men or the devil.' The train was then run to the Bluffs, where it laid until 7 o'clock in the evening, but the tramps did not appear to grow impatient and stuck close to the train. After leaving the Bluffs they began to drop off at the different stations the bulk of them stopping at Mt. Sterling, Clayton and Camp Point. On Friday morning those who got off at Camp Point intended to leave on the Chicago, Burlington & Quincy train going north, but the Chicago, Burlington & Quincy officials got wind of their intentions and frustrated their designs by running the train at that station at full speed. As the train passed the body of tramps standing on the depot platform, a number of them drew their revolvers and with imprecations of rage demanded that the engineer stop the train, threatening to fire should he disobey. No attention was paid to their demonstrations and the tramps were left to swallow their disappointment as they could."

Another account says that those who stopped at Camp Point did board a Chicago, Burlington & Quincy train on Friday and rode to Bushnell. Some fifteen or twenty went to Quincy, where they were arrested by the police, but there was no place to keep them, so they were discharged with injunctions to leave the town."

Exhibit at Paris by the American Society of Civil Engineers.

At the Boston convention of this society a report was presented concerning the exhibit of drawings, etc., illustrative of American engineering, which has been collected by a committee appointed for this purpose, and shown in a place set apart for the purpose at the Paris Exhibition. Upon the presentation of this report at the convention, Mr. T. C. Clarke, who had just returned from Paris, mentioned the interest of foreign engineers in the exhibit, and urged that an effort be made to add to the collection, and J. Dutton Steele offered a resolution to the effect that the Paris Exhibition Committee prepare a subscription paper to raise funds to print a short memoir, in English and French, on the distinctive features of American engineering.

A Boat-Race Seen from a Train.

At the recent Yale-Harvard boat-race on the Thames, at New London, Conn., the New London Northern Company, whose track runs alongside the river, fitted up 25 flat cars with seats in tiers, rising one above another. The seats were all taken at a fair price, the train started with the boats and kept pace with them the whole length of the course, giving the passengers a very satisfactory view of the race, they being able to see the whole of it, from the start to the finish, much better than the spectators on boats on the river, who were obliged to keep behind the race-boats.

European Prices.

Recently the Berlin & Coblenz Railroad, in answer to advertisements for supplies, was able to let contracts for Bessemer rails at \$36 per ton, fish plates at \$33.75, screw spikes at \$67.50 per ton. About the middle of May the Upper Silesian Railroad let contracts for 200 pairs of cast-steel, coupled axles with wrought-iron wheels and steel tires at \$54 per pair, and 800 cast-steel axles with disk wheels at \$58.75 per pair.

OLD AND NEW ROADS.

Alabama Central.—Work has begun on the extension of this road from York, Ala., westward to Lauderdale, Miss., about 15 miles. The company has concluded a contract by which it secures for a term of years the right to use 18 miles of the Mobile & Ohio track, between Lauderdale and Meridian. Its trains now use the Alabama & Chattanooga track between York and Meridian.

Alabama Great Southern.—The United States Circuit Court at Mobile has entered an order directing Charles B. Alexander and others to dismiss certain bills filed by them to enforce the payment of certain coupons issued by the old Wills Valley Company, or else show cause why they should not be punished for contempt.

Atchison, Topeka & Santa Fe.—A circular issued by this company contains the following information as to its new extensions:

"The Pueblo & Arkansas Valley Railroad Company have decided to extend their railroad under their present charter from Pueblo to Leadville and the San Juan mining district, and to build this year, from Canon City to South Arkansas, a distance of 57 miles, the estimated cost of which is \$750,000. It is proposed to raise the money by the issue of first mortgage 7 per cent. gold-bonds, with coupons payable semi-annually, limited to \$14,000 per mile of completed road, including rolling stock. This extension, when built, will be placed under lease to the Atchison, Topeka & Santa Fe Railroad Company, on the same terms and conditions as the present line from Kansas to Pueblo.

"The New Mexico & Southern Pacific Railroad Company have decided to build their road from the north line of New Mexico, commencing at the Raton Pass and running via Las Vegas to Albuquerque on the Rio Grande River, a distance of 248 miles, the estimated cost of which is \$2,621,000. The company will issue a first-mortgage 7 per cent. 30-year gold bond on its road, including rolling stock, interest payable semi-annually, and limited to \$15,000 per mile of completed road. This bond will be further secured by a lease from the Atchison, Topeka & Santa Fe Railroad Company for 90 years, paying 27 per cent. of the gross earnings, and also a rebate of 15 per cent. on business delivered to, and secured from, said road at the State line of New Mexico, which re-

bate shall be reduced ratably as the bonds are canceled, but never below 10 per cent., said rebate to be applied:

"1. To payment of any interest on bonds not provided for by the earnings of said road under the lease.

"2. To the purchase by advertisement of said bonds, when they can be purchased at not exceeding 10 per cent. above their par value, the bonds so purchased to be immediately canceled and converted into stock for the benefit of the Atchison, Topeka & Santa Fe Railroad Company.

"3. To the rebate in proportion to the mileage which the business passes over this road."

Boston, Hoosac Tunnel & Western.—The 40 days which the recent act of the Massachusetts Legislature gave the Troy & Boston to surrender its lease of the Troy & Greenfield road through Vermont has expired, and that company has taken no action. The Boston, Hoosac Tunnel & Western has therefore filed the necessary papers and made arrangements to build a parallel line at once, as provided in the act. It is thought probable, however, that the Troy & Boston will try to interpose some legal obstacles.

Burlington & Missouri River in Nebraska.—This company announces that it has agreed to take a perpetual lease of the Republican Valley Railroad, which is to extend from Hastings, Neb., west by south into and through the valley of the Republican River in Southern Nebraska, about 71 miles. The new road is expected to have a considerable business, and will also open up for settlement a large body of land belonging to this company. The Republican Valley Company will issue \$1,000,000 stock, all of which will be held by the lessee, and will also issue \$853,000 (being \$12,000 per mile) of first-mortgage, 40-year, 6 per cent. bonds. The lessee is to pay the interest on these bonds and to have the privilege of exchanging them, after July 1, 1879, for its own 6 per cent. consolidated bonds. The lessee also agrees to purchase the bonds at maturity, if not sooner retired or exchanged. Under this arrangement the new road will be substantially the property of the Burlington & Missouri River Company.

Central, of New Jersey.—A branch about one mile long has been built leading from the track of the Long Branch Division to the Monmouth Park race-course near Long Branch, N. J. It is to be used to carry passengers to the Park when race meetings are in progress.

Chesapeake & Ohio.—In Richmond, June 29, the Virginia Circuit Court entered an order directing the transfer of the road to the purchasers at the foreclosure sale, and fixing the form of deed to be made and the manner of the transfer. A preliminary organization of the new company has been completed, and a meeting of the persons entitled to stock therein will soon be held to complete the organization.

Chicago & Lake Huron.—On June 27, the Chicago & Northeastern Company took possession of its line from Flint, Mich., to Lansing, which has heretofore been worked as part of this road. Equipment is borrowed from the Michigan Central. It has been for some time reported that the Chicago & Northeastern Company was under the control of Mr. Vanderbilt, and the present move is said to be made for the purpose of breaking up the Chicago & Lake Huron line, and preventing its use as the Chicago connection of the Grand Trunk.

The Chicago & Northeastern Company, however, announces its willingness to arrange for the running of through trains on fair terms.

Cincinnati, Sandusky & Cleveland.—At a special meeting of stockholders, held June 26, it was voted to approve the agreements made for funding certain coupons on the second-mortgage bonds, and for an amended lease of the Columbus, Springfield & Cincinnati road at a reduced rental. The amended lease has also been ratified by the stockholders of the lessor company.

Columbus, Chicago & Indiana Central.—The Trustees and Receivers will pay on presentation at the office of A. Iselin & Co., No. 48 Wall street, New York, the following coupons, which became due Jan. 1, 1878: Columbus & Indianapolis preferred first-mortgage, common first-mortgage and second-mortgage bonds; Columbus & Indianapolis Central first-mortgage bonds.

Denver & Rio Grande.—Track on the Fort Garland Branch is now laid to Alamosa, Col., which is 30 miles beyond the late terminus at Garland and 220 miles from Denver. Trains run through to Alamosa for the first time June 22. It is understood that this branch of the road will not be extended any further at present, the company giving its attention to the line from El Moro to Santa Fe.

Detroit & Milwaukee.—The final decree of foreclosure has been settled in the Wayne Circuit Court at Detroit. The Court finds that the amount due on the first-mortgage bonds and coupons is \$4,492,760.86; on the second-mortgage bonds and coupons, \$2,919,545.50, making \$6,412,306.36 in all. The property is directed to be sold, after due advertisement, in two parcels, one the road and its appurtenances, the other the equipment and certain real estate in Detroit. The sale is to be for cash, but if the property is bought for the bondholders, bonds and coupons may be accepted as cash at their *pro rata* value. Purchasers shall deposit at the time of sale \$50,000 for the first and \$10,000 for the second parcel of the property. Out of the proceeds of the sale there shall be paid: Firstly, the fees and disbursements lawfully allowed to the commissioner; secondly, the costs and expenses in these causes, of the complainants and defendants, and the trustees of the mortgages, as shall be determined by the court. The residue of the proceeds of parcel No. 1 shall be applied toward the payment of all bonds or coupons secured by the first mortgage, and in case of a surplus, such surplus shall be applied to the payment of the bonds and coupons secured by the second mortgage. The residue of the proceeds of parcel No. 2 shall be applied toward the payment of bonds and coupons secured by the second mortgage, and if any surplus remains it shall be applied to the payment of all the bonds and coupons secured by the first mortgage. After the payments above provided for, if any moneys remain they shall be paid to such persons as may be found entitled to them under proceedings hereafter to be taken.

The purchaser of the road (designated as parcel No. 1) shall take the same subject to the indebtedness heretofore created by the Receiver, and to all contracts and obligations outstanding, provided he has made no previous arrangement with such contractors for a modification of their contracts.

Eastern.—In the suit brought to determine the liability of this company to pay interest on the Portsmouth, Great Falls & Conway bonds, the Massachusetts Supreme Court rendered its decision, July 1, the following being the rescript:

"Decreed to be entered that it is not the duty or right of the Eastern Railroad Company to apply the earnings of its railroad to the payment of interest on the bonds of the Portsmouth, Great Falls & Conway Railroad Company as it shall from time to time accrue and become due. By several

agreements between the Portsmouth, Great Falls & Conway Railroad Company, the Eastern Railroad Company in New Hampshire, and the Eastern Railroad Company, the last-named corporation agrees to pay, as or in lieu of rent for the leased railroads of the other two corporations, the same dividends to the stockholders of the other two corporations which it pays to its own stockholders. Such agreements do not create any liability on the part of the Eastern Railroad Company to pay the principal or interest of bonds issued by the Portsmouth, Great Falls & Conway Railroad Company; its only liability on these bonds is by virtue of its contract of guarantee entered into when it negotiated such bonds."

The bonds in question are an issue made by the Portsmouth, Great Falls & Conway Company in part payment of money advanced by the Eastern for the construction of the road. The Eastern holds about \$500,000 of the bonds, and sold about \$500,000 more with its guarantee endorsed. The effect of the decision is that holders of the bonds have no claim for the payment of the interest as rental, but have a claim against the Eastern Company as guarantor, and are placed substantially on the same footing as the other creditors of that company who have taken its certificates of indebtedness or new mortgage bonds in payment. Like the bonds of some other New England companies, the Portsmouth, Great Falls & Conway bonds are plain bonds, that is, they are not secured by a mortgage on the road, and no foreclosure can be had. Probably some compromise will be arranged with the bondholders.

Eastern Shore.—The Harlan & Hollingsworth Company, of Wilmington, Del., has filed a bill in the United States Circuit Court for the foreclosure of the first mortgage on this road, and asking for the appointment of a receiver. Complainant owns \$103,000 out of \$187,250 bonds issued. The Court set the case for Sept. 4, at Baltimore.

East River Bridge.—The trustees have decided to let the contract for the charcoal iron wire, to be used for the outside wrapping of the cables, to J. Lloyd Haigh, of New York, at 3.95 cents per pound.

Gulf, Colorado & Sante Fe.—The Galveston News states that President Kopperl has concluded negotiations in New York with parties to agree to furnish the money to extend the road to Belton, Tex., provided the promised county subscriptions are made good.

Work is progressing on the extension of the road five miles beyond its present terminus (which is 45 miles westward from Galveston) and on the bridge over the Brazos River.

Hartford, Providence & Fishkill.—A dispatch from Hartford, Conn., says that the New York & New England Company has decided to pay the bonds of this company Oct. 1, and to take possession of the road. The Hartford, Providence & Fishkill road extends from Providence, R. I., to Waterbury, Conn., 122 miles, and has for nearly 20 years been operated by trustees for the benefit of the bondholders. Some years ago a contract was made for the transfer of the road to the Boston, Hartford & Erie Company (to which the New York & New England is successor) whenever that company should provide for the payment of the bonded debt, amounting to \$2,055,500. This is the contract under which the payment is to be made. Besides the completed road, much work has been done on an extension from Waterbury to the Hudson River at Fishkill, N. Y. There has heretofore been opposition to the transfer of the road, and it is possible that legal steps may be taken to prevent it. The opposition came from the cities of Providence and Hartford, which are large bondholders.

Kalamazoo, Lowell & Northern Michigan.—This company has decided to issue \$600,000 first-mortgage 7 per cent. bonds, to carry out the contract for the completion of the road, which was lately concluded with Mr. J. G. French, of Montpelier, Vt. At least \$75,000 of the bonds will, it is expected, be taken up on the line of the road, or by persons interested in its construction.

Kansas Pacific.—Trouble is said to have arisen between the holders of the Denver Extension bonds and the parties who have made up the agreement with the Union Pacific under which the Kansas Pacific is to be reorganized. The agreement concluded by these parties with the Denver Extension bondholders was as follows:

1. Holders to receive \$40, gold, a certificate for \$87.50, and \$2.10 for each coupon certificate on each bond, on surrender of their bonds.

2. Interest for five years from Aug. 1, 1878, to be paid at the rate of 5 per cent.

3. At the end of five years, or sooner, at the option of the pool, a cash payment equal to 80 per cent. of the bonds and unpaid coupons to be made, or,

4. New 5 per cent. bonds to be issued in exchange for the old ones to the amount of \$8,000,000, secured on the same property as the old ones and guaranteed by the Union Pacific.

Now it is said that without notice this has been withdrawn and a new agreement substituted as follows:

1. Five per cent. interest to be paid on the bonds, to begin six months after they are deposited.

2. At the end of five years, or sooner, to pay the bondholders 75 cents on the dollar in cash for their bonds, or to issue new five per cent. bonds substantially as by the first agreement.

3. The pool to deposit \$500,000 Denver Extension bonds as security for the performance of the agreement, which is to take effect if \$8,000,000 bonds are deposited with the United States Trust Company within 30 days.

4. The pool to control the foreclosure suit, and to have the right to buy in the property when sold, paying non-assenting bondholders their *pro rata* share of the purchase money.

The object of the change is said to be to secure the control of the foreclosure suit, which will give the pool a great advantage.

The Denver Extension bonds amount to \$6,380,000. They are a first lien on 245 miles of the road from Denver east, and on one-half the lands between the 380th mile-post and Denver, and are a third lien on the rest of the road. The total amount of bonds and unpaid coupons is now about \$8,200,000.

Kendall & Eldred.—The track is now laid and a train running from Eldred, Pa., on the Buffalo, New York & Philadelphia road, east by north to Rixford, four miles. On the other end of the road track is down from Kendall, N. Y., southeast to Sawyer City, five miles. A gap of about six miles remains, which will be closed early in July. The road is built to serve a section of the new Bradford oil region.

Kings County Central.—This new road was opened for travel by an excursion and dinner June 29. It is 3½ miles long and of 3-ft. gauge, extending from the Willink Entrance to Prospect Park in Brooklyn southeastward past the county buildings near Flatbush to a junction with the New York & Manhattan Beach road, about 4½ miles from Manhattan Beach on Coney Island. The new road serves to give the Manhattan Beach road a connection which will make it easy of access from a large section of Brooklyn. It is leased to the New York & Manhattan Beach Company for 99 years at 40 per cent. of the gross receipts. It has been

built and is chiefly owned by Mr. E. B. Litchfield, of Brooklyn.

Lake Shore & Michigan Southern.—At a meeting of the board, held June 28, the following statement was submitted by the Auditor for the half-year ending June 30, June partly estimated:

	1878.	1877.	Inc. or Dec.	P. c.
Gross earnings.....	\$6,663,318	\$6,461,166	I. \$202,152	3.1
Expenses.....	4,292,105	4,628,119	D. 336,014	7.3
Net earnings.....	\$2,371,213	\$1,833,047	I. \$538,166	29.4
Interest, rents and guarantees stock div.....	1,380,000	1,387,800	D. 7,800	0.6
Surplus.....	\$901,213	\$445,247	I. \$545,966	122.6
Per cent. of expenses.....	64.50	71.50	D. 7.00	9.8

"From the balance for 1878 there have been paid \$200,000 for a subscription for that amount of the stock of the Pittsburgh & Lake Erie Railroad Company, and \$80,000 for lands in Chicago. The former was to aid in the construction of a line from Pittsburgh via Youngstown, running over the Mahoning Coal Railroad, leased by this company, and reaching this company's line at Ashtabula and the water-front and docks at Ashtabula Harbor. This enterprise will, it is believed, contribute largely to this company's traffic at remunerative rates—sufficiently to amply compensate for the investment. The land at Chicago has long been considered necessary for the convenient and economical transaction of the company's business. Some years ago negotiations for its purchase at \$150,000 were carried on. Being in market at the price now paid, and other parties being desirous to purchase and improve, so as to practically place it out of the reach of the company in the future, it was taken. About 5,000 tons of steel rails have been laid during the six months, and the excess of cost over old rails taken up has been charged to operating expenses. During the six months \$70,000 was paid on account of the Ashtabula accident, all claims for which, except five or six, are now disposed of. The road and property of the company have been fully maintained at the standard condition; there is no floating debt nor any outstanding obligations in that nature."

The board resolved that it would not be sound policy at this time to increase the funded debt by the sale of bonds for expenditures on capital account, and approved the following disposition of the surplus:

Surplus, as above.....	\$901,213
Payments on Ashtabula accident.....	\$70,000
Sinking fund, six months.....	125,000
Subscription to Pittsburgh & Lake Erie stock.....	200,000
Purchase of land at Chicago.....	80,000
Dividend of 1 per cent.....	494,665
	969,665

Leaving surplus of..... \$21,548

The dividend paid at this time last year was 2 per cent., and it had been generally expected that not less would be paid this year.

Maryland & Delaware.—The United States Circuit Court at Wilmington, Del., has made an order confirming the sale of the section of the road in Delaware, which was made in January last. The road was then bought by the trustees for the bondholders, who at the same time bought the road in Maryland, which was sold under a decree from the State court.

Memphis, Paducah & Northern.—This company, formerly the Paducah & Memphis, has begun work on the grading of an extension of the Memphis Division from Covington, Tenn., northward to Ripley, about 15 miles. The grading is nearly done to the Hatchie River, six miles.

Metropolitan Elevated.—The residents along the line of this road, late the Gilbert Elevated, in New York, are much exercised about the noise and smoke of the trains, and this feeling has culminated in a memorial to the Grand Jury, signed by a number of physicians requesting that the matter be investigated, and the company indicted for maintaining a nuisance, if it can be legally done.

The company is desirous of preventing any annoyance to citizens, and has applied to Mr. Thomas A. Edison, the celebrated inventor, to see if he can devise some method of lessening the noise and preventing the escape of smoke and cinders from the engines.

Minneapolis Belt.—This company has been organized in Minneapolis, Minn., to build a railroad or track to connect the principal mills with the railroads entering the city.

Montclair & Greenwood Lake.—There is said to be opposition to the plan of reorganization proposed, holders of bonds being unwilling to contribute more money, and not believing that they will receive any great benefit from the extension of the road. The plan, however, has not yet been formally submitted to the parties in interest, and it is not by any means certain how they will receive it.

New York Elevated.—This company has given notice of an increase of its capital stock from \$1,500,000 to \$5,000,000, and a new issue of \$5,000,000 bonds, raising the authorized funded debt to \$7,000,000. The new issues are for the purpose of paying for extensions, improvements and new equipment. The amount of the former issues actually outstanding is \$1,068,000 stock and \$1,798,000 bonds.

New York, Lake Erie & Western.—It is once more reported that additional shops are to be built at Port Jervis, N. Y., and most of the work taken there which is now done at Jersey City, leaving at the latter place only small shops to do the work which is indispensable at the end of a division. It is said that the land at Jersey City is needed for other purposes, and that additional land would be very expensive, while at Port Jervis the company has plenty of unoccupied land.

Ohio & Mississippi.—Receiver King's May statement is as follows:

Balance, May 1.....	\$37,706.39
Receipts.....	296,574.02
Total.....	\$334,280.41

Disbursements..... 262,558.77

Balance, June 1..... \$71,721.64

The receipts exceeded the disbursements by \$34,015.25 for the month

Oregon Central.—The report that the German bondholders had transferred their interest in this road is denied by local papers, on the authority of officers of the company. They also state that arrangements are now being made for the extension of the road southward.

Pacific Mail Steamship Co.—This company has completed a settlement with the Panama Railroad Company, the terms of which are said to be the payment of \$100,000 cash and \$160,000 in notes at 30, 60 and 90 days in adjustment of past claims; future traffic balances to be settled monthly. This settlement only relates to current business, and does not affect the debts arising out of the sale of the Panama Transit Company's steamers to the Pacific Mail.

Peterboro.—At a special meeting of the stockholders in

Nashua, N. H., it was resolved to issue \$185,000 new 8 per cent. bonds for the purpose of paying off the present debt of the company. A large amount of the bonds have already been subscribed for by stockholders. The road is 11 miles long, from Wilton, N. H., to Greenfield, and is leased to the Nashua & Lowell. It has hitherto had no bonded debt.

Pittsburgh Southern.—The branch to Morgantown, W. Va., is now partly under contract and the gaading of 15 miles, from Finleyville, Pa., to the National Road, is to be finished by September.

Plainview.—Contracts have been let for the grading and bridging of this road, the work to be done by Aug. 1. It is to run from Plainview, Minn., to the Winona & St. Peter at Eysota, about 14 miles.

Powell's Valley.—The incorporators of this company met at Jacksboro, Tenn., June 17 and completed a preliminary organization. A committee was appointed to solicit stock subscriptions along the line and a formal application made to the County Court of Campbell County for an election to be held on the question of making a county subscription of \$50,000. The proposed line is from Careyville, Tenn., on the Knoxville & Ohio road, northeast up the valley of Powell's River to Cumberland Gap, about 40 miles.

River Falls.—Work on this road has been delayed by some difficulty about getting timber for the bridges, but is now well advanced. The grading is all done, the ties on hand and the rails have been laid. The road will be about 18 miles long, from River Falls, Wis., northwest to Hudson, and will be worked as a branch of the Chicago, St. Paul & Minneapolis road.

Rochester & Northern Minnesota.—Work on this line is progressing well, the first section of 10 miles from Rochester, Minn., northward, being graded and tracklaying begun.

Rumford Falls & Buckfield.—This company has its road so far completed that freight trains have begun to run through from the junction with the Grand Trunk at Mechanics' Falls, Me., to Rumford Falls, a distance of about 42 miles. Of this line about 14½ miles, from Rumford Falls eastward to Canton, are new track; the remaining 27½ miles are run on the track of the old Portland & Oxford Central, which was pronounced unsafe by the Railroad Commissioners several years ago, and has since been practically abandoned. The new company was appointed Receiver of this old road some time since.

St. Louis, Ottumwa & Cedar Rapids.—It is reported that the Chicago, Milwaukee & St. Paul has offered to iron and work this road, provided money enough can be raised along the line to pay for the grading, bridging and ties. The line is from Cedar Rapids, Ia., south by west through Sigourney to Ottumwa, and about one-third of it was graded several years ago.

St. Paul & Pacific.—The St. Paul Pioneer-Press of June 28 says:

"An interview with Manager J. P. Farley, yesterday, brought out the gratifying information that all obstacles to the advancement of its lines had been removed, and that work would be at once pushed forward on both the St. Vincent and Alexandria lines, and that both would be completed by the first day of October next."

"Regarding the St. Vincent Extension, it may be remarked that the men are now in the field, and that the work of preparing the road-bed for the superstructure is rapidly going forward. For 28 miles north of Crookston the road has been ironed since 1872, and extensive repairs on this portion of the line are demanded, such as repairing the decayed ties, filling up the crevices which have been washed in the track and clearing away the rubbish which has been accumulated by the ravages of time. The grading from the end of the track to St. Vincent will also be proceeded with; and it will be done in the course of a very few months. Mr. Farley has made contracts for the iron with the Cambria Iron Company, of Johnstown, Pa., and 35 car-loads of rails are now on the way to St. Paul. Contracts are now completed for the ties; and 100 men will take immediately to the woods on Red Lake River, where 50,000 are to be delivered as required. One hundred thousand ties are also contracted for, to be delivered on the track between Wayzata and Litchfield. No difficulty is anticipated in securing all the ties required, and as soon as needed. There is every reason to believe that the Pembina Branch of the Canadian Pacific will be completed as soon as the St. Vincent Branch of the St. Paul & Pacific, in which case the cars will be running between St. Paul and Winnipeg by the first day of the coming October. * * *

"The news about the Alexandria Branch is not less satisfactory. The road from Melrose to Sauk Centre will be completed by the 1st of August, and to Alexandria by the 1st of October. The iron and ties for this portion of the line are also provided for, and St. Paul and Alexandria will therefore be united by the indissoluble bonds of railroad iron in less than a hundred days."

Springfield, Jackson & Pomeroy.—The track on this road is now all laid from Springfield, O., to Jackson, 108 miles, with the exception of one mile, on which is a Howe-truss bridge 300 feet long. It is expected that this mile will be finished and the road open by June 15. The new track has been laid between Waverley, O., and Greenfield, 23 miles apart.

Texas & Pacific.—Texas papers state that the suit of Stevenson, Smith and others against this company, which has been pending on the chancery docket of the United States Circuit Court for the Western District of Texas, at Tyler, for more than five years, was disposed of in that court at Austin, recently. Judge Duval, acting as Circuit Judge, rendered a final decree dismissing the complainants' bills with costs in favor of the defendants, and holding, as he announced in his opinion, that the pretended bonds of the Southern Pacific Railroad Company, of which the complainants claimed to be holders, had their origin in fraud. The amount claimed was about \$500,000.

Texas Western.—It is reported that this company has concluded arrangements with parties in New York, who will take a controlling interest and will at once extend the road westward from its present terminus at Pattison, 41 miles from Houston, Tex.

Utah & Northern.—This road (formerly the Utah Northern) is now completed to Portneuf Cañon, Idaho, 45 miles northward from the old terminus at Franklin, and 135 miles from the southern terminus at Ogden, Utah. Iron is still going forward, and the company expects to reach Snake River before winter.

Vicksburg & Meridian.—In the foreclosure suit now pending in the United States Circuit Court for the Southern District of Mississippi, all holders of bonds and coupons of said railroad company, secured by any mortgages or deeds of trust made by said company, whether made in its present corporate name, the Vicksburg & Meridian Railroad Com-

pany, or its former corporate name, the Southern Railroad Company, are notified that by an interlocutory decree of the Court, rendered May 29, 1878, they are allowed until Sept. 1, 1878, to present to James McKee, Clerk and Master, at his office in Jackson, Miss., their bonds and coupons, with affidavits of their ownership, to be made before a United States Commissioner, or a United States Consul, if they reside abroad. They are further notified that if their bonds are indorsed bonds, issued under the mortgage or deed of trust of said railroad company, dated in March, 1866, made to McAlister and others as trustees therein, their affidavits accompanying their bonds and coupons must state the indorsement and the color of the ink with which that endorsement was written on their bonds, by whom the endorsement was signed, and the number of their bonds. They are further notified that by the terms of said interlocutory decree unless they present their bonds and coupons and file them before Sept. 1, as required by the decree, they will lose the benefit of the suit and of any decrees that may be made therein.

Wabash.—At Chicago, June 27, the United States Circuit Court denied the motion for a receiver in the Tyson suits, on the ground that no sufficient reason had been shown for such action. The bondholders had their remedy in a foreclosure suit, but at present it did not appear that a receivership was necessary.

Portions of the decision, as announced by Judge Harlan, are reported by the Chicago papers as follows:

"The Court said there had been a default in paying interest. The present management, in executing the funding scheme, had been paying interest to those bondholders who had assented to the scheme, but declined to pay interest to the complainant and those joined with him, who had refused to become parties to the funding scheme. They based their action in this particular upon the idea that it was their duty to deal upon principles of equality with all the bondholders. It was claimed that the present managers were not applying all the revenue arising from the operation of the road to the payment of interest in the order of priority of mortgages, but were applying a portion to the discharge of obligations created by the Seney mortgage, the last upon the property—that this was a misapplication of the income, and that the managers were not keeping the agreement made at the time they took charge; that they had no right to require complainant to submit to a funding scheme which he does not approve of. On the other hand, the vast majority of the bondholders under all mortgages insisted that the funding scheme was the best for all concerned, and that, under that arrangement, faithfully and honestly carried out, the rights of all the parties would be best secured. That it would be carried out in good faith, the evidence would not permit the Court to doubt. Without going into the reasons arising out of the evidence for the conclusion he had arrived at, he would say that he could not doubt that the appointment of a receiver at this time would not only break up this line of railway into its original fragments, but would overturn the funding scheme, thereby destroying a large per cent. of the income for the great majority of the bondholders entitled to preference. It would, in addition, inevitably throw the financial ruin of all the interests involved in this railroad enterprise subordinate to the first mortgage bondholders, including the interests of even the complainant and those united with him in the suit. Those who would certainly suffer, and suffer first, would be the stockholders of the old company, and who became stockholders in the new organization."

"Under such circumstances, and with a probability, recognized by sagacious men, that the country would soon pass from the era of hard times into an era of general prosperity for all, including those who hold railroad securities, he could not, in deference to the merely technical rights of a very small minority of bondholders, lay hands upon a railroad 600 miles long, running through three States, and thereby imperil, if not destroy, the rights of those who were entitled to equal consideration with the complainant and his colleagues. If the present management of the road were guilty of fraud or mismanagement in controlling the property, he should feel differently. While there were differences between some of the bondholders as to some matters connected with the discharge of the company's obligations, those differences did not involve the integrity of the gentlemen who were operating the road. He was disposed to recognize the absolute necessity of large discretion in the management of such vast property, and in the distribution of income, and he was unwilling, for the present, at least, to appoint a receiver, but should leave the parties to the ordinary remedies for the enforcement of their rights."

At Chicago, June 29, the Court granted the petition of certain bondholders, and ordered that the company should reserve from the gross earnings a sum sufficient to meet their claims, the amount to be fixed by the Court. It was also ordered that separate accounts be kept of the earnings of the St. Louis Division, pending the trial of the suit to foreclose the first mortgage on that division.

Winston & Mooresville.—At a meeting held in Winston, N. C., June 27, it was resolved to organize a company to be known as the Winston & Mooresville Railroad Company, to build a road from Mooresville in Davie County northeast about 25 miles to the Northwestern North Carolina road at Winston. The intention is to extend the road hereafter from Winston to Danville, Va.

Worcester & Somerset.—It is said that this line is to be extended from Newtown, Md., eastward about 12 miles to a point near Franklin, the terminus of the Worcester Railroad. The object is to secure a share of the large oyster and fish trade from Chincoteague Sound.

Worthington & Sioux Falls.—Work is progressing rapidly on the extension of this road, and it is expected that trains will run through before August to Sioux Falls, Dakota, 16 miles beyond the present terminus at Beaver Falls, Minn., and 58 miles from the junction with the Sioux City & St. Paul at Worthington.

Xenia & Kokomo.—This company has filed articles of incorporation in Indiana for a railroad from Kokomo east by north to Xenia in Miami County, about 15 miles. The capital stock is to be \$200,000.

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Camden & Atlantic.

This company owns a line from Camden, N. J., east by south to Atlantic City, 60 miles, and it works under lease the May's Landing road, from Egg Harbor City to May's Landing, 7 miles. It also runs a ferry across the Delaware between Camden and Philadelphia. The chief business of the road is the summer pleasure travel to Atlantic City, but it has also a considerable traffic in market supplies raised for the Philadelphia markets. The report is for the year ending Dec. 31.

The equipment consists of 12 engines; 60 passenger, 4 mail and smoking and 4 baggage cars; 50 box, 61 gondola, 7 flat, 13 lime and 8 timber cars; 1 wreck, 1 derrick and 1 gravel train caboose car. There are also 8 horse cars used on the

track at Atlantic City, and the ferry boats used on the Delaware.

The balance sheet is as follows:

Stock (\$20,262 per mile)	\$1,215,711.50
Bonded debt (\$18,044 per mile)	1,082,650.65
Floating debt	43,284.85
Profit and loss	342,154.67

Total (\$44,730 per mile) \$2,683,801.67

Property accounts (\$42,963 per mile) \$2,577,809.99
Stocks and bonds 26,229.47
Cash, materials, balances due 79,762.21

\$2,683,801.67

Of the stock \$377,400 is common, \$895,150 preferred and \$161,500 scrip. The bonded debt consists of \$490,000 first-mortgage, \$497,000 second-mortgage bonds, \$250.65 coupon scrip and \$95,400 land bonds and mortgages.

The mileage for the year was:

	1877.	1876.	Decrease, P.c.
Locomotive mileage	259,210	261,826	2,616 1.0
Car mileage	1,519,672	1,592,040	72,968 4.5
Cost per train mile	92.4 cts.	95.9 cts.	3.5 cts. 3.6
Cost per car mile	15.3 cts.	15.3 cts.	

The earnings for the year were as follows:

	1877.	1876.	Dec. or Inc. P.c.
Passengers	\$284,258.11	\$342,579.04	D. \$58,320.93 17.0
Freight	104,813.55	121,251.70	D. 16,438.15 13.6
Express, mail, etc.	42,193.28	48,832.62	D. 6,639.34 13.6
May's Landing Br.	3,171.18	3,624.98	D. 453.80 12.6
Ferry	43,047.34	48,562.86	D. 5,515.52 11.3

Total \$477,483.46 \$561,851.20 D. \$87,367.74 15.5
Expenses 300,441.89 297,878.44 I. 2,563.45 0.9

Net earnings, \$177,041.57 \$286,972.76 D. \$89,931.19 33.7
Gross earn. per mile 7,126.62 8,431.06 D. 1,304.44 15.5
Net earn. per mile 2,642.41 3,884.67 D. 1,342.26 33.7
Per cent. of exps. 62.92 52.74 10.18 19.3

The early summer travel was light, and while passenger and freight business was stimulated by decrease in rates late in the season, the low rates kept down the earnings, while expenses remained about the same. The number of passengers was greater than in 1877. The loss on the May's Landing Branch, after paying expenses, was \$5,623.50.

The income account (condensed) was as follows:

Net earnings	\$177,041.57
Received on bonds and stocks	2,970.53
Total	\$180,012.10
Interest, etc.	\$92,379.68
January dividend, 2 per cent.	24,311.00
Construction and equipment	17,688.50
Bonded debt paid	8,000.00

Balance \$37,622.71

This balance is accounted for by an increase of \$34,574.50 in floating assets (cash and receivables) and a decrease of \$8,048.21 in floating debt.

During the year 201% tons iron and 401 tons steel rail were used in renewals; 17,541 new ties were laid on Main Line, 2,985 on May's Landing Branch, and 3,818 for new sidings. Several bridges were repaired and renewed, and work begun on an iron bridge to replace the wooden one at Kirkwood. Several improvements were made in stations, and the picnic grounds at Lakeside Park were cleared and put in order. The ferry boats required large repairs after their hard service in the ice during the severe winter of 1876-77. The road is in excellent order to carry a heavy travel this year.

Cincinnati, Hamilton & Dayton.

This company works the following lines:

	Miles.
Cincinnati, Hamilton & Dayton, owned, Cincinnati to Dayton	60
Dayton & Michigan, leased, Dayton to Toledo	142
Cin., Richmond & Chicago, leased, Hamilton, O., to Richmond, Ind.	45
Cin., Hamilton & Indianapolis, leased, Hamilton, O., to Indianapolis	98

Total 345

The Cincinnati, Hamilton & Indianapolis was acquired at foreclosure sale, and there is no stock but that held by the lessee. The report is for the year ending March 31.

The equipment consists of 86 engines; 55 passenger and 26 mail and baggage cars; 981 box, 198 stock, 203 coal, 416 flat and 31 caboose cars; 5 wrecking cars and 149 hand and truck cars.

The general account (condensed) is as follows:

Stock (\$58,333 per mile)	\$3,500,000.00
Bonds (\$45,583 per mile)	2,735,000.00
Surplus earnings	1,445,550.05
Interest, dividend and rental account	118,214.06
Bills payable, pay-rolls, balances due	630,136.93

Total (\$140,582 per mile) \$8,434,901.04

During the year \$351,000 third mortgage bonds were paid and the mortgage canceled. Of this amount \$129,879.90 was provided from a fund on hand, and \$223,120.10 by the issue of bills payable. There are \$250,000 consolidated bonds unsold. The stocks and bonds of the leased lines are as follows:

	Stock.	Bonds.
Dayton & Michigan	\$3,607,628	\$4,728,800
Cincinnati, Richmond & Chicago	382,600	625,000
Cincinnati, Hamilton & Indianapolis	2,500,000

Net earnings, \$203,594.93 \$267,636.48 D. \$64,041.55 23.9

Gross earn. per m. 6,442.67 5,703.90 D. 1,061.23 18.6

Net " 1,588.60 2,088.30 D. 499.70 23.9

Per cent. of exps. 65.78 63.39 L. 2.39 3.8

The earnings were divided as follows:

	P.C. of
Gross earn.	Net earn.
West Jersey and Cape May & Millville	60.83
Salem	18.60
Swedesboro R. R., leased, Elmer to Salem	41.35
Swedesboro R. R., leased, Woodbury to Swedesboro	16.58
Total	10.80
Interest	128.16

The company substantially owns the Cape May & Millville, and holds a controlling interest in the Salem road.

The equipment consists of 20 engines; 52 passenger and 11 baggage and mail cars; 30 box, 2 stock, 60 flat and 120 dump cars; 26 hand and 20 truck cars.

The general account is as follows:

Stock (\$22,880 per mile)	\$1,359,750.00
Bonds (\$40,384 per mile)	2,400,000.00
Accounts and balances	67,946.48
Profit and loss	39,742.93

Total \$3,867,439.41

The sinking funds hold \$142,000 West Jersey, \$45,000

Cape May & Millville, and \$35,500 Swedesboro bonds.

Included in stocks and bonds are \$70,000 Salem stock, \$404,650 stock and \$421,000 bonds of the Cape May & Millville.

The earnings for the year were as follows:

	1877.	1876.	Inc. or Dec. P.c.
Passengers	\$362,767.52	\$477,423.72	D. \$114,656.20 24.0
Freight	177,501.96	196,170.45	D. 18,668.49 9.5
Mails and exp.	54,755.56	57,417.26	D. 2,661.70 4.6

Total \$585,025.04 \$731,011.43 D. \$135,986.39 18.5

Expenses 391,430.11 463,374.05 D. 71,944.84 16.5

Net earn'gs \$203,594.93 \$267,636.48 D. \$64,041.55 23.9